Declaration of Conformance – Mercury Racing Sterndrive 600SCi (600 HP)

Manufacturer:

Mercury Racing
N7480 County Road UU
Fond du Lac, WI 54935
USA

Authorized Representative:

Marine Power Europe, Inc.
Parc Industriel de Petit-Rechain B-2800
Verviers,
Belgium

Recreational Craft Directive 2003/44/EC amending 94/25/EC

Applicable Requirement	Standards Applied
Owner's manual (A.2.5)	ISO 10240
Handling characteristics (A.4)	ISO 8665
Inboard Engine (A.5.1.1)	ISO 15584; ISO 7840; ISO 10133
Fuel System (A.5.2)	ISO 7840; ISO 8469
Electrical System (A.5.3)	ISO 10133; ISO 8846
General Steering System (A.5.4.1)	Applicable portions of: ABYC P-21; EN ISO 10592
Exhaust emission requirements (B.2)	ISO 8178-1
Owner's manual (B.4)	ISO 8665

Module used for exhaust emission assessment: Modules B+C,

EC-Type Examination Certificate No.: EXMERC001.

The notified body responsible for EC-Type Examination for the engine exhaust emissions assessment is

IMCI
Rue Abbe Cuypers 3
B – 1040, Brussels – Belgium

Notified Body No.: 0609

Engine Type: Sterndrive

Fuel Type: Gasoline

Combustion Cycle: 4 Stroke

Engine Family Name: 600SCi

Starting Serial Number: 0M955821

Electromagnetic Compatibility Directive 89/336/EC

Generic emission standard	BS EN 61000-6-3
Generic immunity standard	BS EN 61000-6-1
Vehicles, boats and internal combustion engine driven devices - Radio disturbance characteristics	SAE J551; CISPR 12
Electrostatic discharge testing	BS EN 61000-4-2; BS EN 61000-4-3

This declaration is issued under the sole responsibility of Mercury Marine and Marine Power Europe.

Patrick C. Mackey

President - Mercury Marine, Fond du Lac, WI USA

Regulatory contact:
Engineering - Regulations
Mercury Racing
N7480 County Road UU
Fond du Lac, WI 54935-9585
USA

Thank You

for your purchase of one of the finest marine power packages available. It incorporates numerous design features to assure operating ease and durability.

With proper care and maintenance, you will thoroughly enjoy using this product for many boating seasons. To ensure maximum performance and carefree use, we ask that you thoroughly read this manual.

The Operation, Maintenance & Warranty Manual contains specific instructions for using and maintaining your product. We suggest that this manual remain with the product for ready reference whenever you are on the water.

Again, thank you for purchasing one of our Mercury Marine products. We sincerely hope your boating will be pleasant!

Mercury Racing,
N7480 County Road "UU"
Fond du Lac, WI 54935-9585

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Warranty Message

The product you have purchased comes with a limited warranty from Mercury Marine; the terms of the warranty are set forth in the **Warranty Information** section of this manual. The warranty statement contains a description of what is covered, what is not covered, the duration of coverage, how to best obtain warranty coverage, important disclaimers and limitations of damages, and other related information. Please review this important information.

⚠ WARNING

The operator (driver) is responsible for the correct and safe operation of the boat, the equipment aboard and the safety of all occupants aboard. We strongly recommend that the operator read this Operation, Maintenance and Warranty Manual and thoroughly understand the operational instructions for the power package and all related accessories before the boat is used.

⚠ WARNING

The engine exhaust from this product contains chemicals known to the state of California to cause cancer, birth defects or other reproductive harm.

Safety Alerts and Notices

Throughout this publication, dangers, warnings, cautions, and notices[0], accompanied by the international HAZARD symbol ⚠, are used to alert the technician to special instructions concerning a particular service or operation that may be hazardous if performed incorrectly or carelessly. Observe these safety alerts carefully.

These safety alerts alone can not eliminate the hazards they signal. Strict compliance to these special instructions when performing the service, and common sense operation are major accident prevention measures.

⚠ DANGER

Indicates a hazardous situation which, if not avoided, will result in death or serious injury.

⚠ WARNING

Indicates a hazardous situation which, if not avoided, could result in death or serious injury.

⚠ CAUTION

Indicates a hazardous situation which, if not avoided, could result in minor or moderate injury.

NOTICE

Indicates a situation which, if not avoided, could result in engine or major component failure.

0. These safety alerts follow ANSI standard Z535.6-2006 for product safety information in product manuals, instructions, and other collateral materials.

IMPORTANT: Identifies information essential to the successful completion of the task.

NOTE: *Indicates information that helps in the understanding of a particular step or action.*

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WARRANTY INFORMATION

Warranty Registration United States And Canada

Outside United States and Canada - Check with your local distributor.

1. You may change your address at any time, including at time of warranty claim, by calling Mercury Marine or sending a letter or fax with your name, old address, new address, and engine serial number to Mercury Marine's warranty registration department. Your dealer can also process this change of information.
   Mercury Marine
   Attn.: Warranty Registration Department
   W6250 W. Pioneer Road
   P.O. Box 1939
   Fond du Lac, WI 54936-1939
   920-929-5054
   Fax 920-929-5893

NOTE: *Registration lists must be maintained by Mercury Marine and any dealer on marine products sold in the United States, should a safety recall notification under the Federal Safety Act be required.*

2. At the time of sale, the dealer should complete the warranty registration and immediately submit it to Mercury Marine via MercNET, E-mail, or mail. Upon receipt of this warranty registration, Mercury Marine will record the registration.

IMPORTANT: Your warranty coverage begins at the time of sale, but warranty claims cannot be processed until the product is registered with Mercury Marine.

3. Upon processing the warranty registration, Mercury Marine will send the purchaser a Mercury Owner Resource Guide. The back page of this guide contains your warranty registration information and should be saved. If this registration verification is not received within 30 days, please contact your selling dealer immediately.

Transfer Of Warranty

The limited warranty is transferable to a subsequent purchaser, but only for the remainder of the unused portion of the limited warranty. This will not apply to products used for commercial applications.

WARRANTY INFORMATION

To transfer the warranty to the subsequent owner, send or fax a copy of the bill of sale or purchase agreement, new owner's name, address and engine serial number to Mercury Marine's warranty registration department. In the United States and Canada, mail to:

Mercury Marine
Attn: Warranty Registration Department
W6250 W. Pioneer Road
P.O. Box 1939
Fond du Lac, WI 54936-1939
920-929-5054
Fax 920-929-5893

Upon processing the transfer of warranty, Mercury Marine will send registration verification to the new owner of the product by mail.

There is no charge for this service.

For products purchased outside the United States and Canada, contact the distributor in your country, or the Marine Power Service Center closest to you.

Mercury Racing Division One Year Limited Warranty

WHAT IS COVERED

Mercury Marine warrants its new products (and remanufactured products sold under the trade name "Pacemaker") to be free of defects in material and workmanship during the period described below.

DURATION OF COVERAGE

This Limited Warranty provides coverage for one (1) year from either the date the product is first sold to a recreational use retail purchaser, or the date on which the product is first put into service, whichever occurs first. The repair or replacement of parts, or the performance of service under this warranty, does not extend the life of this warranty beyond its original expiration date. Unexpired warranty coverage can be transferred to a subsequent purchaser upon proper re-registration of the product.

WARRANTY INFORMATION

CONDITIONS THAT MUST BE MET IN ORDER TO OBTAIN WARRANTY COVERAGE

Warranty coverage is available only to retail customers that purchase from a Dealer authorized by Mercury Marine to distribute the product in the country in which the sale occurred, and then only after the Mercury Marine specified pre-delivery inspection process is completed and documented. Warranty coverage becomes available upon proper registration of the product by the authorized dealer. Inaccurate warranty registration information regarding recreational use, or subsequent change of use from recreational to commercial may void the warranty at the sole discretion of Mercury Marine. Routine maintenance outlined in the Operation and Maintenance Manual must be timely performed in order to maintain warranty coverage. Mercury Marine reserves the right to make warranty coverage contingent upon proof of proper maintenance.

WHAT MERCURY WILL DO

Mercury's sole and exclusive obligation under this warranty is limited to, at our option, repairing a defective part, replacing such part or parts with new or Mercury Marine certified re-manufactured parts, or refunding the purchase price of the Mercury product. Mercury reserves the right to improve or modify products from time to time without assuming an obligation to modify products previously manufactured.

WARRANTY INFORMATION

HOW TO OBTAIN WARRANTY COVERAGE

The customer must provide Mercury with a reasonable opportunity to repair and reasonable access to the product for warranty service. Warranty claims shall be made by delivering the product for inspection to a Mercury dealer authorized to service the product. If purchaser cannot deliver the product to such a dealer, written notice must be given to Mercury. We will then arrange for the inspection and any covered repair. Purchaser in that case shall pay for all related transportation charges and/or travel time. If the service provided is not covered by this warranty, purchaser shall pay for all related labor and material, and any other expenses associated with that service. Purchaser shall not, unless requested by Mercury, ship the product or parts of the product directly to Mercury. Proof of registered ownership must be presented to the dealer at the time warranty service is requested in order to obtain coverage.

WARRANTY INFORMATION

WHAT IS NOT COVERED

This limited warranty does not cover routine maintenance items, tune ups, adjustments, normal wear and tear, damage caused by abuse, abnormal use, use of a propeller or gear ratio that does not allow the engine to run in its recommended wide-open-throttle RPM range (see the **Operation and Maintenance Manual**), operation of the product in a manner inconsistent with the recommended operation/duty cycle section of the **Operation and Maintenance Manual**, neglect, accident, submersion, improper installation (proper installation specifications and techniques are set forth in the installation instructions for the product), improper service, use of an accessory or part not manufactured or sold by us, operation with fuels, oils or lubricants which are not suitable for use with the product (see the **Operation and Maintenance Manual**), alteration or removal of parts, water entering the engine through the fuel intake, air intake or exhaust system, or damage to the product from insufficient cooling water caused by blockage of the cooling system by a foreign body, running the engine out of water, mounting the engine too high on the transom, or running the boat with the engine trimmed out too far. The commercial use of the product, defined as any work or employment related use of the product, or any income generating use of the product, even if such use is only occasional, will void the warranty. Use of the product for racing or other competitive activity, at any point, even by a prior owner of the product, voids the warranty. Expenses related to haul-out, launch, towing, storage, telephone, rental, inconvenience, slip fees, insurance coverage, loan payments, loss of time, loss of income, tournament fees, club fees, prize money or any other type of incidental or consequential damages are not covered by this warranty. Also, expenses associated with the removal and/or replacement of boat partitions or material caused by boat design for access to the product are not covered by this warranty.

WARRANTY INFORMATION

No individual or entity, including Mercury Marine authorized dealers, has been given authority by Mercury Marine to make any affirmation, representation or warranty regarding the product, other than those contained in this limited warranty, and if made, shall not be enforceable against Mercury Marine. For additional information regarding events and circumstances covered by this warranty, and those that are not, see the **Warranty Coverage** section of the **Operation and Maintenance Manual**, incorporated by reference into this warranty.

DISCLAIMERS AND LIMITATIONS THE IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE ARE EX-PRESSLY DISCLAIMED. TO THE EXTENT THAT THEY CANNOT BE DISCLAIMED, THE IMPLIED WARRANTIES ARE LIMITED IN DURATION TO THE LIFE OF THE EXPRESS WARRANTY. INCIDENTAL AND CONSEQUENTIAL DAMAGES ARE EXCLUDED FROM COVERAGE UNDER THIS WARRANTY. SOME STATES/ COUNTRIES DO NOT ALLOW FOR THE DISCLAIMERS, LIMITATIONS AND EXCLUSIONS IDENTIFIED ABOVE, AS A RESULT, THEY MAY NOT APPLY TO YOU. THIS WARRANTY GIVES YOU SPECIFIC LEGAL RIGHTS, AND YOU MAY ALSO HAVE OTHER LEGAL RIGHTS WHICH VARY FROM STATE TO STATE AND COUNTRY TO COUNTRY.

Products Sold to Government Agencies

Contact the Mercury Racing Sales Department for a copy of the Government Agencies Warranty Packet Kit which explains the conditions required for government agencies to receive warranty when purchasing Mercury Racing Outboard or Sterndrive product.

Mercury Racing Sales Department
N7840 County Road UU
Fond du Lac, WI 54935
920-921-5330
Fax 920-921-6533

WARRANTY INFORMATION

Warranty Coverage and Exclusions for Mercury Racing Sterndrive Products

The purpose of this section is to help eliminate some of the more common misunderstandings regarding warranty coverage. The following information explains some of the types of services that are not covered by warranty. The provisions set forth following have been incorporated by reference into the Mercury Racing Division Three Year Limited Warranty Against Corrosion Failure, the Mercury Racing Division 90 Day, 6 months and One Year Limited Warranties.

Keep in mind that warranty covers repairs that are needed within the warranty period because of defects in material and workmanship. Installation errors, accidents, normal wear, and a variety of other causes that affect the product are not covered.

Warranty is limited to defects in material or workmanship, but only to retail customers that purchase from a Dealer authorized by Mercury Marine to distribute the product in the country in which the sale occurred, and then only after the Mercury Marine specified pre-delivery inspection process is completed and documented.

Should you have any questions concerning warranty coverage, contact your authorized dealer. They will be pleased to answer any questions that you may have.

GENERAL EXCLUSIONS FROM WARRANTY

1. Minor adjustments and tune-ups, including checking, cleaning or adjusting spark plugs, ignition components, carburetor or EFI settings, filters, belts, controls, and checking lubrication made in connection with normal services.
2. Damage caused by lack of maintenance.
3. Haul-out, launch, towing charges, and all related transportation charges and/or travel time, etc.
4. Additional service work requested by customer other than that necessary to satisfy the warranty obligation.

5. Labor performed by other than an authorized dealer may be covered only under following circumstances: When performed on emergency basis (providing there are no authorized dealers in the area who can perform the work required or have no facilities to haul out, etc., and prior factory approval has been given to have the work performed at this facility).
6. Use of other than Mercury Precision or Quicksilver parts when making warranty repairs.
7. Engine noise does not necessarily indicate a serious engine problem. If diagnosis indicates a serious internal engine condition, which could result in a failure, condition responsible for noise should be corrected under the warranty.
8. Lower unit and/or propeller damage caused by striking a submerged object is considered a marine hazard.
9. Water in the starter motor.
10. Starter motors and/or armatures or field coil assembly, which are burned, or where lead is thrown out of commutator because of excess cranking.
11. Valve or valve seat grinding required because of wear.

GENERAL INFORMATION

Boater's Responsibilities

The operator (driver) is responsible for the correct and safe operation of the boat and safety of its occupants and general public. It is strongly recommended that each operator (driver) read and understand this entire manual before operating the power package.

Be sure at least one additional person on board is instructed in the basics of starting and operating the power package, and boat handling in case the driver is unable to operate the boat.

Boat Horsepower Capacity

⚠ WARNING

Avoid serious injury, death or property damage from overpowering a boat. Using a power package that exceeds the maximum horsepower limit of a boat can:

- **Cause loss of boat control.**
- **Place too much weight at the transom altering the designed flotation characteristics of the boat**
- **Cause the boat to break apart, particularly around the transom area.**

Do not overpower or overload your boat. Most boats will carry a required capacity plate indicating the maximum acceptable power and load as determined by the manufacturer following certain federal guidelines. If in doubt, contact your dealer or the boat manufacturer.

U.S. COAST GUARD CAPACITY	
MAXIMUM HORSEPOWER	XXX
MAXIMUM PERSON CAPACITY (POUNDS)	XXX
MAXIMUM WEIGHT CAPACITY	XXX

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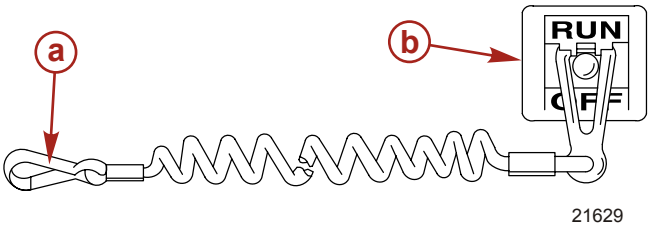
High-Speed and High-Performance Boat Operation

If your power package is to be used on a high speed or high performance boat with which you are unfamiliar, we recommend that you never operate it at its high speed capability without first requesting an initial orientation and familiarization demonstration ride with your dealer or an operator experienced with your boat/power package combination. For additional information, obtain a copy of our **Hi-Performance Boat Operation** booklet from your dealer, distributor, or Mercury Marine.

Lanyard Stop Switch

The purpose of a lanyard stop switch is to turn off the engine when the operator moves far enough away from the operator's position (as in accidental ejection from the operator's position) to activate the switch. A lanyard stop switch can be installed as an accessory - generally on the dashboard or side adjacent to the operator's position.

While activation of the lanyard stop switch will stop the engine immediately, a boat will continue to coast for some distance depending upon the velocity and degree of any turn at shut down. However, the boat will not complete a full circle. While the boat is coasting, it can cause injury to anyone in the boat's path as seriously as the boat would when under power.



a - Lanyard cord
b - Lanyard stop switch

We strongly recommend that other occupants be instructed on proper starting and operating procedures should they be required to operate the engine in an emergency (e.g. if the operator is accidentally ejected).

⚠ WARNING

Should the operator fall out of the boat, the possibility of serious injury or death from being run over by the boat can be greatly reduced by stopping the engine immediately. Always properly connect both ends of the stop switch lanyard to the stop switch and the operator.

⚠ WARNING

Avoid serious injury or death from deceleration forces resulting from accidental or unintended stop switch activation. The boat operator should never leave the operator's station without first disconnecting the stop switch lanyard from the operator.

Accidental or unintended activation of the switch during normal operation is also a possibility. This could cause any, or all, of the following potentially hazardous situations:

- Occupants could be thrown forward due to unexpected loss of forward motion - a particular concern for passengers in the front of the boat who could be ejected over the bow and possibly struck by the gear case or propeller.
- Loss of power and directional control in heavy seas, strong current or high winds.
- Loss of control when docking.

Trailering Boat

The boat can be trailered with the drive unit in up or down position. Adequate road clearance is required between road and gear housing skeg when trailering with the drive unit in down position.

If adequate road clearance is a problem, place drive unit in full up position.

Protecting People In The Water

WHILE YOU ARE CRUISING

It is very difficult for a person in the water to take quick action to avoid a boat heading in their direction, even at slow speeds.

Always slow down and exercise extreme caution any time you are boating in an area where there might be people in the water.

Whenever a boat is moving (even coasting) and the gear shift is in neutral, there is sufficient force by the water on the propeller to cause the propeller to rotate. This neutral propeller rotation can cause serious injury.

WHILE BOAT IS STATIONARY

⚠ WARNING

Stop your engine immediately whenever anyone in the water is near your boat. Serious injury to the person in the water is likely if contacted by a rotating propeller, a moving boat, a moving gearcase, or any solid device rigidly attached to a moving boat or gearcase.

Shift into neutral and shut off the engine before allowing people to swim or be in the water near your boat.

Exhaust Emissions

BE ALERT TO CARBON MONOXIDE POISONING

Carbon monoxide is present in the exhaust fumes of all internal combustion engines. This includes the outboards, sterndrives and inboard engines that propel boats, as well as the generators that power various boat accessories. Carbon monoxide is a deadly gas that is odorless, colorless and tasteless.

Early symptoms of carbon monoxide poisoning which should not be confused with seasickness or intoxication, include headache, dizziness, drowsiness, and nausea.

⚠ WARNING

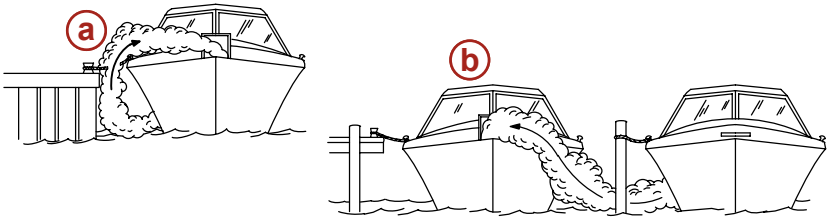
Avoid the combination of a running engine and poor ventilation. Prolonged exposure to carbon monoxide in sufficient concentration can lead to unconsciousness, brain damage, or death.

POOR VENTILATION

Under certain running and/or wind conditions, permanently enclosed or canvas enclosed cabins or cockpits with insufficient ventilation may draw in carbon monoxide. Install one or more carbon monoxide detectors in your boat.

Although the occurrence is rare, on a very calm day, swimmers and passengers in an enclosed area of a stationary boat that contains or is near a running engine may be exposed to a hazardous level of carbon monoxide.

While Boat Is Stationary



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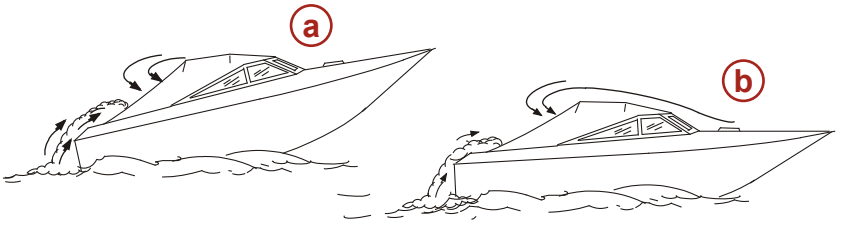
a - Running the engine when the boat is moored in a confined space.

b - Mooring close to another boat that has its engine running.

While Boat is Moving



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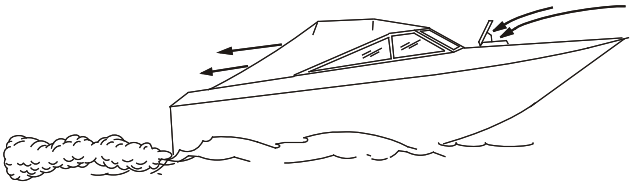
a - Running the boat with the trim angle of the bow too high.

b - Running the boat with no forward hatches open (station wagon effect).

GOOD VENTILATION

Ventilate passenger area, open side curtains, or forward hatches to remove fumes.



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Wave And Wake Jumping

Operating recreational boats over waves and wake is a natural part of boating. However, when this activity is done with sufficient speed to force the boat hull partially or completely out of the water, certain hazards arise, particularly when the boat re-enters the water.

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The primary concern is the boat changing direction while in the midst of the jump. In such case the landing may cause the boat to veer violently in a new direction. Such a sharp change in direction can cause occupants to be thrown out of their seats, or out of the boat.

⚠ WARNING

Avoid serious injury or death from being thrown within or out of a boat when it lands after jumping a wave or wake. Avoid wave or wake jumping whenever possible. Instruct all occupants that if a wake or wave jump occurs, get low and hang on to any boat hand hold.

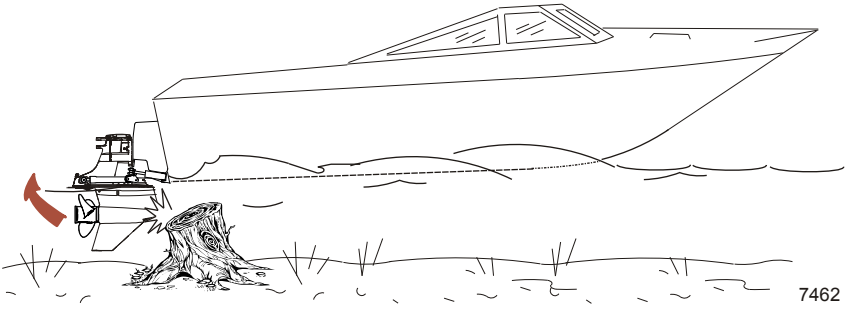
There is another less common hazardous result from allowing your boat to launch off a wave or wake. If the bow of your boat pitches down far enough while airborne, upon water contact it may penetrate under the water surface and submarine for an instant. This will bring the boat to a nearly instantaneous stop and can send the occupants flying forward. The boat may also steer sharply to one side.

Impact With Underwater Hazards

⚠ WARNING

Operating the boat in shallow water can result in serious injury or death due to impact with underwater hazards. Always operate the boat at safe speeds in shallow water.

Reduce speed and proceed with caution whenever you drive a boat in shallow water areas, or in areas where you suspect underwater obstacles may exist which could be struck by the sterndrive or the boat bottom. The most important thing you can do to help reduce injury or impact damage from striking a floating or underwater object is to control the boat speed. Under these conditions, boat speed should be kept to a minimum planing speed 24 to 40 km/h (15 to 25 MPH)



Striking a floating or underwater object could result in an infinite number of situations. Some of these situations could result in the following:

- Part of the sterndrive or the entire sterndrive could break loose and fly into the boat.
- The boat could move suddenly in a new direction. Such a sharp change in direction can cause occupants to be thrown out of their seats or out of the boat.
- A rapid reduction in speed. This will cause occupants to be thrown forward, or even out of the boat.
- Impact damage to the sterndrive and/or boat.

Keep in mind, the most important thing you can do to help reduce injury or impact damage during an impact is control the boat speed. Boat speed should be kept to a minimum planing speed when driving in waters known to have underwater obstacles.

⚠ WARNING

Operating a boat or engine with impact damage can result in product damage, serious injury, or death. If the vessel experiences any form of impact, have an authorized Mercury Marine dealer inspect and repair the vessel or power package.

After striking a submerged object, stop the engine as soon as possible and inspect it for any broken or loose parts. If damage is present or suspected, the sterndrive should be taken to an authorized dealer for a thorough inspection and necessary repair.

The boat should also be checked for any hull fractures, transom fractures, or water leaks.

Operating a damaged sterndrive could cause additional damage to other parts of the sterndrive, or could affect control of the boat. If continued running is necessary, do so at greatly reduced speeds.

Safe Boating Suggestions

In order to safely enjoy the waterways, familiarize yourself with local and other governmental boating regulations and restrictions, and consider the following suggestions.

Use flotation devices. Have an approved personal flotation device of suitable size for each person aboard (it is the law) and have it readily accessible.

Do not overload your boat. Most boats are rated and certified for maximum load (weight) capacities (refer to your boat capacity plate). If in doubt, contact your dealer or the boats manufacturer.

Perform safety checks and required maintenance. Follow a regular schedule and ensure that all repairs are properly made.

Check safety equipment on-board. Here are suggestions of the types of safety equipment to carry when boating:

- Approved fire extinguisher; paddle or oar.
- Signal devices: flashlight, rockets or flares, flag and whistle or horn.
- Spare propeller, thrust hubs and an appropriate wrench.
- Tools for necessary minor repairs; first aid kit and book.
- Anchor, extra anchor line; water-proof storage containers.

- Manual bilge pump and extra drain plugs; compass and map or chart of area.
- Spare operating equipment; batteries, bulbs, fuses, etc.
- Transistor radio and drinking water.

Know signs of weather change and avoid foul weather and rough-sea boating.

Tell someone where you are going and when you expect to return.

Know and obey all nautical rules and laws of the waterways. Boat operators should complete a boating safety course. Courses are offered in the U.S.A. by:

1. The U.S. Coast Guard Auxiliary
2. The Power Squadron
3. The Red Cross
4. Your state boating law enforcement agency

Direct all inquiries to the Boating Hotline, 1-800-368-5647 or the Boat U.S. Foundation information number 1-800-336-BOAT.

We strongly recommend that all powerboat operators attend one of these courses.

You should also review the NMMA Sources of Waterway Information booklet. It lists regional sources of safety, cruising and local navigation and is available at no charge by writing to:

Sources of Waterway Information
National Marine Manufacturers Association
410 N. Michigan Avenue
Chicago, IL 60611 U.S.A.

Make sure everyone in the boat is properly seated. Do not allow anyone to sit or ride on any part of the boat that was not intended for such use. This includes the back of seats, gunwales, transom, bow, decks, raised fishing seats, any rotating fishing seat; or anywhere that an unexpected acceleration, sudden stopping, unexpected loss of boat control, or sudden boat movement could cause a person to be thrown overboard or into the boat.

GENERAL INFORMATION

Never be under the influence of alcohol or drugs while boating (it is the law). Alcohol or drug use impairs your judgment and greatly reduces your ability to react quickly.

Know your boating area and avoid hazardous locations.

Prepare other boat operators. Instruct at least one other person on board in the basics of starting and operating the power package, and boat handling, in case the driver becomes disabled or falls overboard.

Passenger boarding. Stop the engine whenever passengers are boarding, unloading, or are near the back (stern) of the boat. Just shifting the power package into neutral is not sufficient.

Be alert. The operator of the boat is responsible by law to maintain a proper lookout by sight and hearing. The operator must have an unobstructed view particularly to the front. No passengers, load, or fishing seats should block the operators view when operating the boat above idle speed.

Never drive your boat directly behind a water skier in case the skier falls. As an example, your boat traveling at 40 km/h (25 MPH) will overtake a fallen skier 61 m (200 ft.) in front of you in five seconds.

Watch fallen skiers. When using your boat for water skiing or similar activities, always keep a fallen or down skier on the operator's side of the boat while returning to assist the skier. The operator should always have the down skier in sight and never back up to the skier or anyone in the water.

Report accidents. Boat operators are required by law to file a Boating Accident Report with their state boating law enforcement agency when their boat is involved in certain boating accidents. A boating accident must be reported if:

1. There is loss of life or probable loss of life
2. There is personal injury requiring medical treatment beyond first aid
3. There is damage to boats or other property where the damage value exceeds $500.00
4. There is complete loss of the boat

IMPORTANT: Seek further assistance from local law enforcement for a complete list of rules and regulations.

Stolen Power Package

If your power package is stolen, immediately advise the local authorities and Mercury Marine of the model and serial number(s) and to whom the recovery is to be reported. This **Stolen Power Package** information is placed into a file at Mercury Marine to aid authorities and dealers in recovery of stolen engines.

SPECIFICATIONS

Power Package Identification

ENGINE IDENTIFICATION

Model:	HP600 SCi
Displacement:	502 C.I.D.
Max WOT RPM:	4800 - 5200
Spark Plugs:	NGK BPR6ES
Spark Plug Gap:	0.035 Inch
Spark Timing:	**non-adjustable
Fuel Octane:	91 (R+M)/2 or 98 RON International
Engine Oil:	**Kendall GT-1 SAE 20W50
Engine Coolant:	Dex-Cool ®

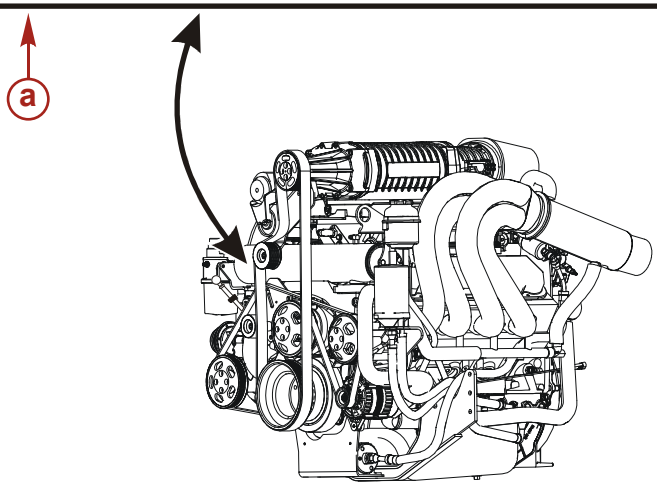
**see owner's manual

SERIAL NUMBERS

ENGINE

DRIVE

TRANSOM



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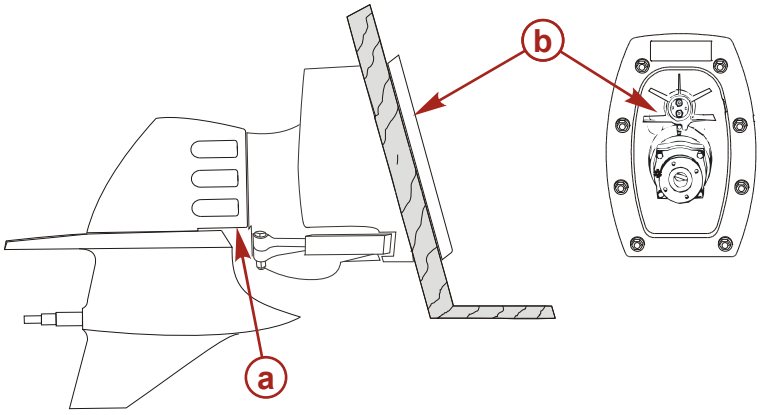
a - Engine identification placard

SPECIFICATIONS

DRIVE UNIT AND TRANSOM ASSEMBLY IDENTIFICATION



a - Drive unit identification tag location (bottom side)

b - Transom assembly identification tag location (inside through transom plate)

SERIAL NUMBERS RECORD

- ☐ **Engine Model/Horsepower:** _____
- ☐ **Engine Serial Number**[1.] : _____
- ☐ **Transom Assembly Serial Number:** _____
- ☐ **Sterndrive Serial Number & Gear Ratio**[2.] : _____
- ☐ **Propeller Number & Pitch:** _____
- ☐ **Running Rotation**[3.] : _____
- ☐ **Hull Identification Number:** _____
- ☐ **Boat Model & Length:** _____

The serial numbers are the manufacturer's keys to numerous engineering details that apply to your Mercury Marine power package. When contacting your authorized Mercury Marine dealer about service, always specify model and serial numbers.

1. The engine serial number is printed on the placard located on the heat exchanger.

2. The gear ratio is stamped on the the bolt located next to the serial number label.
3. The running rotation is stamped on the back of the strut.

General Engine Specifications (HP600)

Horsepower	600 HP (447 kW)
Displacement	8.2 L (502 c.i.)
Cylinder arrangement	V-8
Bore	114 mm (4.47 in.)
Stroke	102 mm (4.00 in.)
Compression ratio	7.5:1
Supercharger	3.3 L Screw-type compressor
Altenator	65 amp / 917 watt
Battery requirements	750 CCA 950 MCA
Ignition type	PCM 03 Distributorless
Spark plug type	NGK BPR6ES
Spark plug gap	0.889 mm (0.035 in.)
Fuel system	Sequential Fuel Injection
Length (transom mount to front of engine)	907 mm (35.7 in.)
Width	838 mm (33.0 in.)
Height	691 mm (27.2 in.)
Weight	575 kg / 1267 lbs

SPECIFICATIONS

Engine Operating Limitations (HP600)

Maximum wide open throttle (W.O.T.) RPM	4800 - 5300 RPM
Rev limit	5400 RPM
Idle RPM in gear	700 RPM
Idle RPM out of gear	750 RPM
Maximum fuel system flow rate	211 L/hr (56 gals/hr) at 5200 RPM
Fuel pressure at idle	407 to 421 kPa (59 to 61 psi)
Fuel pressure at 5200 RPM	469 to 496 kPa (68 to 72 psi)
Coolant thermostat initially opens at temperature	62° C (143° F)
Coolant thermostat is at maximum open at temperature	70° C (158° F)
Minimum water pressure supplied to the engine	207 kPa (30 psi) at 5200 RPM (from oil cooler sensor)
Maximum water pressure supplied to the engine	290 kPa (42 psi) at 5200 RPM (from oil cooler sensor)
Minimum oil pressure at idle (Hot)	138 kPa (20 psi)
Minimum oil pressure at 5200 RPM (Hot)	331 kPa (48 psi)
Maxiumum oil temperature	85° C (185° F)

Fuel Requirements

Use a major brand of unleaded gasoline, preferably without alcohol. Mercury Marine recommends fuels that contain fuel injector cleaner for added internal cleanliness.

⚠ WARNING

FIRE AND EXPLOSION HAZARD: Fuel leakage from any part of the fuel system can be a fire and explosion hazard which can cause serious bodily injury or death. Careful periodic inspection of entire fuel system is mandatory, particularly after storage. All fuel components should be inspected for leakage, softening, hardening, swelling or corrosion. Any sign of leakage or deterioration requires replacement before further engine operation.

SPECIFICATIONS

⚠ CAUTION

Use of improper fuel can seriously damage your engine. Engine damage resulting from use of improper fuel is considered misuse of the engine and damage caused thereby will not be covered under the Mercury Racing limited warranty.

OCTANE REQUIREMENTS (U.S./CANADA)

FUEL TYPE	MINIMUM POSTED OCTANE
Premium Unleaded	(R+M) ÷ 2 = 91 or RON = 98*

*NOTE: *Research Octane Number*

OCTANE REQUIREMENTS (OUTSIDE THE U.S./CANADA)

FUEL TYPE	MINIMUM POSTED OCTANE
Premium Unleaded[1]	(R+M) ÷ 2 = 91 or RON = 98*

*NOTE: *Research Octane Number*

USING REFORMULATED (OXYGENATED) FUELS (USA ONLY)

This type of fuel is required in certain areas of the U.S. The two types of oxygenates used in these fuels are alcohol (Ethanol) or Ether (MTBE or ETBE). If Ethanol is the oxygenate that is used in the gasoline in your area, refer to the **Fuel Containing Alcohol** section.

These reformulated fuels are acceptable for use in your Mercury engine.

FUEL CONTAINING ALCOHOL

If the fuel in your area contains either methanol (methyl alcohol) or ethanol (ethyl alcohol), you should be aware of certain adverse effects that can occur. These adverse effects are more severe with methanol. Increasing the percentage of alcohol in the fuel can also worsen these adverse effects.

1. Mercury Racing does not recommend using leaded gasoline. Leaded gasoline is acceptable in areas where unleaded gasoline is not available; however, lead particles may build up in the exhaust passages and/or the combustion chambers.

Some of these adverse effects are caused because the alcohol in the fuel can absorb moisture from the air, resulting in a separation of the water/alcohol from the gasoline in the fuel tank.

The fuel system components on your Mercury engine will withstand up to 10% alcohol content in the gasoline. We do not know what percentage your boat's fuel system will withstand. Contact your boat manufacturer for specific recommendations on the boats fuel system components (fuel tanks, fuel lines, and fittings).

Fuel containing alcohol may increase:

- Corrosion of metal parts.
- Deterioration of rubber or plastic parts.
- Fuel permeation through rubber fuel lines.
- Starting and operating difficulties.

⚠ CAUTION

Operating a Mercury engine with fuel containing alcohol creates unique problems as a result of the long storage periods common to a boat. In other applications, fuels containing alcohol are normally consumed before they can absorb enough moisture to cause problems. However, boats are often idle enough for the problem of phase seperation to occur in the fuel. In addition, alcohol can wash the protective oil film from internal components resulting in corrosion during storage. Do not store fuel containing alcohol in a fuel tank for a long period of time.

IMPORTANT: Because of possible adverse effects of alcohol in gasoline, it is recommended that only alcohol-free fuel be used where possible.

If only fuel containing alcohol is available, or if the presence of alcohol is unknown, increased inspection frequency for leaks and abnormalities is required.

SPECIFICATIONS

Oil Recommendations

ENGINE CRANKCASE OIL

Preferred Oils	API Classification
Kendall GT-1 Motor Oil 20W-50	SJ, CF-2, CH-4
Oil Filter Should Always Be Changed With Oil	

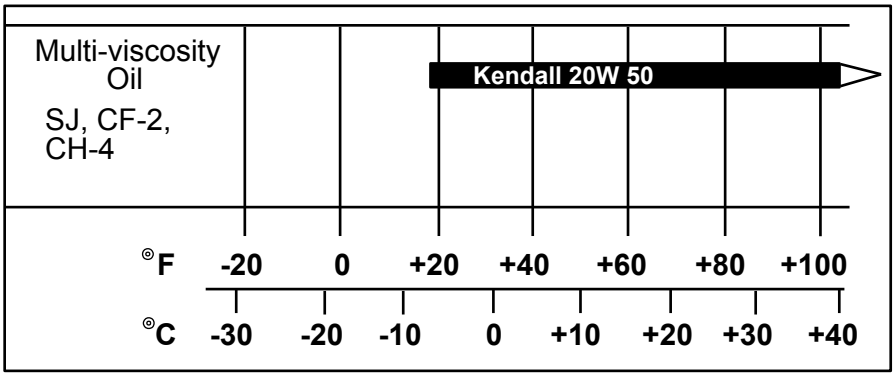
SUPERCHARGER GEARCASE OIL

Preferred Oils	API Classification
Castrol Syntec Synthetic Motor Oil 5W-50	SL, SJ, CF

IMPORTANT OIL PRACTICES

Do Not Use
• Straight weight oils
• Non-detergent oils
• Oils containing solid additives
• Multi-viscosity oils other than the ones recommended
• Low quality oils
Do Not Mix
• Different brands of oils, straight weight or multi-viscosity
• Different weights of straight weight or different weights of multi-viscosity oils.

TEMPERATURE/OIL VISCOSITY CHART



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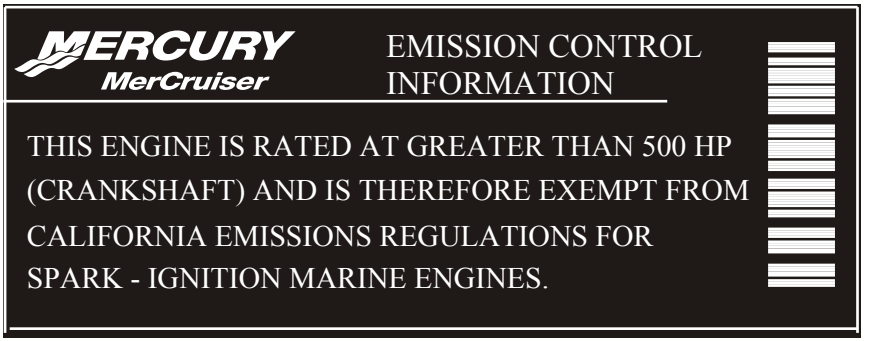
SPECIFICATIONS

Capacities

Unit	Capacity	Fluid Type
Crankcase Oil Capacity with New Filter[1].	8 L (8.5 U.S. qts)	Kendall Motor Oil 20W-50
Supercharger Gearcase	177 ml (6 U.S. oz)	Castrol Syntec Synthetic Motor Oil 5W-50
Closed Cooling System	Approximately 15 L (16 U.S. qts)	Dex-Cool Extended Life Anitfreeze/ Coolant (50-50 mix)
VI Drive Dry Sump Unit Oil Capacity	4 L (4.25 U.S. qts)	Torco MTF Gear Oil
Transom Input Shaft Bearing Housing (Driveline model)	0.47 L (0.5 U.S. qts)	Torco MTF Gear Oil
Transmission fluid capacity[2].	Approximately 1.9 liters (2.0 U.S. qt.)	Type F or FA Transmission Fluid

California Emissions Regulations

An emission certification label, showing emission levels and engine specifications directly related to emissions, is placed on the engine at the time of manufacture.



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1. Always use dipstick to determine exact quantity of oil required.
2. Refer to **Changing Fluids** for the correct procedure to avoid overfilling.

SPECIFICATIONS

Engine Break-in

IMPORTANT: Failure to follow the engine break-in procedures can result in poor performance throughout the life of the engine and can cause engine damage. Always follow break-in procedures.

5 Hr. Break-in Procedure
• Allow engine to warm-up for 30- 60 seconds.
• Do not exceed 3/4 throttle.
• Avoid full throttle acceleration from idle speed.
• Always vary throttle setting.
• Run engine the majority of time between 3000 - 4500 RPM.
• Frequently check engine oil level. Add oil if needed. It is normal for oil consumption to be high during break-in period.

After Break-In Period

To help extend the life of your power package, Mercury Marine recommends the following:

After 5 hr. Break-in
• Use a propeller that allows the engine to operate at or near the top of the maximum RPM range (See **Specifications** section) when at full throttle with a normal boat load.
• Do not advance the throttle until the engine runs smoothly at idle and water temperature reaches a minimum of 54 °C (130 °F). Do not operate at full throttle until the engine oil temperature reaches 60 °C (140 °F).
• Follow the maintenance schedule in this manual.

Instrumentation

It is important to monitor critical engine and boat functions while the boat is in operation. The SmartCraft boat information system uses gauges and/or a System View monitor screen to display the information.

Mercury Racing requires that the following critical engine functions be monitored:

- Oil pressure
- Engine RPM
- Oil temperature
- Water temperature
- System voltage
- Guardian fault messages

SmartCraft instruments display all of the above critical engine functions, as well as others not listed. SmartCraft instruments also display information about power train sensor faults and Guardian activation.

Warning System

The engine's warning system includes an audible alert consisting of a horn located in the helm harness, and the Engine Guardian system. Do not attempt to alter or disable the warning system in any way.

NOTICE
A continuous horn indicates a critical fault. Operating the engine during a critical fault can damage components. If the warning horn emits a continuous beep, do not operate the engine unless avoiding a hazardous situation.

OPERATION

ENGINE GUARDIAN SYSTEM

The Engine Guardian system monitors sensors on the engine for any early indications of problems. If a sensor indicates a fault, the system responds to the problem by emitting a continuous or intermittent horn and, depending on the type of fault, may reduce engine power to provide engine protection. If the boat is equipped with System View, a message will be given on the display screen in conjuction with the horn. Refer to the System View manual for details. When the key switch is turned "ON", the warning system's horn beeps once to verify horn operation.

Fault Type and Related Warning Signal

- Critical - Steady horn
- Severe - 5 beeps, each 3 seconds long
- Warning - 3 beeps, each 1.5 seconds long
- Caution - 2 beeps, each 1 second long
- To stop an activated horn warning, turn off the engine. If the horn continues to sound on restart, the system detected a fault again. See your Mercury Marine dealer to correct the problem as soon as possible.
- If on restart the beeping stops, the problem does not need immediate attention but will require you to see your authorized Mercury Marine dealer to diagnose and clear the fault.

If the Propulsion Control Module (PCM) detects a fault signal from an engine sensor, it records a fault code. A Digital Diagnostic Terminal (DDT) or Computer Diagnostic System (CDS) is required to extract specific problem codes from the PCM.

WARNING SYSTEM TABLE

The following table is divided into four columns. The Possible Cause column lists items that could be initiating the fault. The Horn column lists the type of audible alert that will be given if a fault is detected. If the boat is equipped with System View, the Monitor Display column indicates whether or not a message will be given on the screen. The Guardian Activated and Engine Power Reduced column indicates if the PCM will reduce engine power or force the engine into an idle based on the severity of the problem. The table lists only the possible problem areas and not specific error codes or messages recorded by the PCM.

Possible Cause	Horn	Monitor Display	Guardian Activated and Engine Power Reduced
PCM Error	Steady Horn	Yes	Forced Idle
Battery charging high or low	Steady Horn	Yes	Yes
Low Seawater Pressure	Steady Horn	Yes	Yes
Low Oil Pressure	Steady Horn	Yes	Yes
Engine Overspeed	Steady Horn	Yes	No
Charge Temperature Overheat	Steady Horn	Yes	Yes
MAP Sensor Error	Steady Horn	Yes	No
Oil Temperature High	Steady Horn	Yes	No
Coil Pack Failure	5 Beeps-3 Sec. Long	Yes	No
Fuel Injector Failure	5 Beeps-3 Sec. Long	Yes	No
Fuel Pump Failure	5 Beeps-3 Sec. Long	Yes	No
Idle Air Control Failure	5 Beeps-3 Sec. Long	Yes	No
Guardian Envoked	3 Beeps-1.5 Sec. Long	Yes	No
Coolant Overheat	3 Beeps-1.5 Sec. Long	Yes	Yes
Knock Sensor	3 Beeps-1.5 Sec. Long	Yes	Yes
Charge Temperature Sensor Failure	3 Beeps-1.5 Sec. Long	Yes	No
Oil Temperature Sensor Failure	3 Beeps-1.5 Sec. Long	Yes	No
Cam Sensor	3 Beeps-1.5 Sec. Long	Yes	No
Oil Pressure Sensor Failure	3 Beeps-1.5 Sec. Long	Yes	Yes

Possible Cause	Horn	Monitor Display	Guardian Activated and Engine Power Reduced
Fuel Pressure Sensor Failure	3 Beeps-1.5 Sec. Long	Yes	No
Block Pressure Sensor Failure	3 Beeps-1.5 Sec. Long	Yes	No
Charge Temperature Sensor Failure	3 Beeps-1.5 Sec. Long	Yes	No
Coolant Temperature Sensor	3 Beeps-1.5 Sec. Long	Yes	No
Throttle Position Sensor	3 Beeps-1.5 Sec. Long	Yes	Yes
Low Battery Voltage	2 Beeps-1 Sec. Long	Yes	No
Low Drive Lube[1.]	2 Beeps-1 Sec. Long	Yes	No

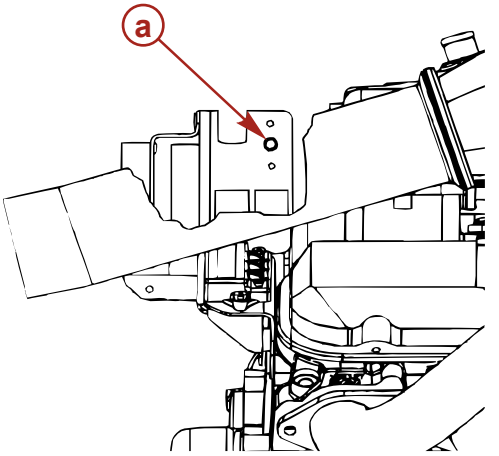
Electrical System Overload Protection

If an electrical overload occurs, a fuse or circuit breaker opens. Locate and correct the problem before replacing the fuse or resetting the circuit breaker.

1. This message refers to Transmission Fluid Overheat when the Six Drive is installed. Check the transmission fluid level if this message is displayed.

OPERATION

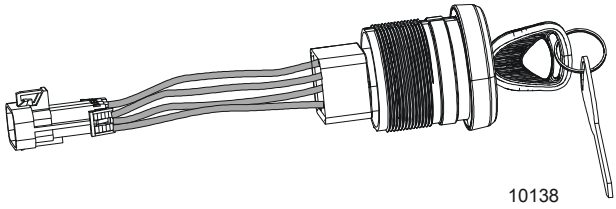
A circuit breaker protects the engine wiring harness and instrumentation power lead. Reset by pushing the reset button.



a - Reset button

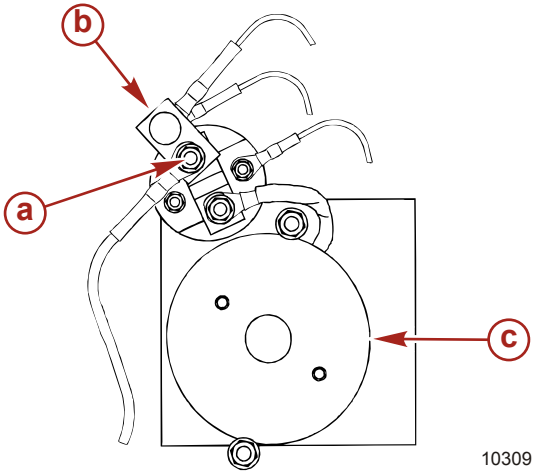
In an emergency, if you cannot locate and correct the cause of the high current draw, and you must operate the engine, perform the following:

1. Turn off or disconnect all accessories connected to the engine and instrumentation wiring and reset the circuit breaker.
2. If the breaker remains open, electrical overload is still present. Inspect the electrical system.
3. A 15 amp fuse, located on the engine's electrical panel, protects the keyswitch power. Check for an open fuse if the key is turned to "START" and nothing happens (and circuit breaker is not tripped).



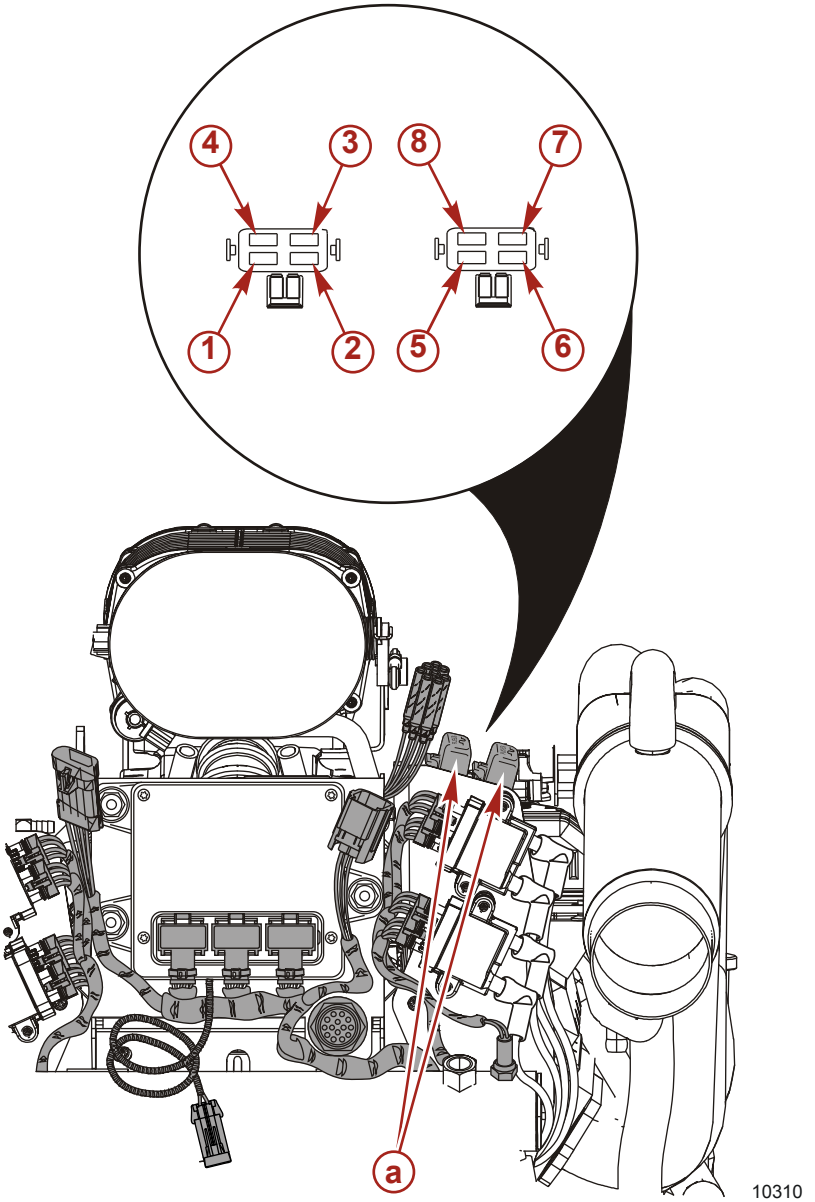
a - Ignition switch "I" terminal lead

4. The power trim pump is internally protected from thermal overload. If it overheats, it will shut off, allowing itself to cool and then reset. However, it is recommended that the power trim system be installed with additional overload protection. Therefore, the power trim may be protected from overload by a 90 amp fuse in the power supply to the pump and a 20 amp in-line fuse to the switch power.
5. A 90 amp fuse is located on the starter.



a - Positive (+) battery cable
b - 90 amp fuse
c - Starter

6. Eight fuses are located at the upper rear of the engine in two fuse holders (four fuses in each holder).



a - Fuse holders (2)

Fuse Holder - C26	Fuse Holder - C27
(1) - 15 amp - RED to RED/BLU constant power	(5) - 20 amp - RED/BLK to RED/PNK coil
(2) - 5 amp - PPL to PPL/WHT accessories	(6) - 20 amp - RED/GRN to RED/WHT fuel injection
(3) - 15 amp - RED/GRN to RED/ORN hour meter	(7) - 25 amp - RED/BLK to RED/PNK fuel pump
(4) - 15 amp - RED to RED/PPL key switch/CAN power	(8) - 20 amp - RED/GRN to RED/BLU driver power

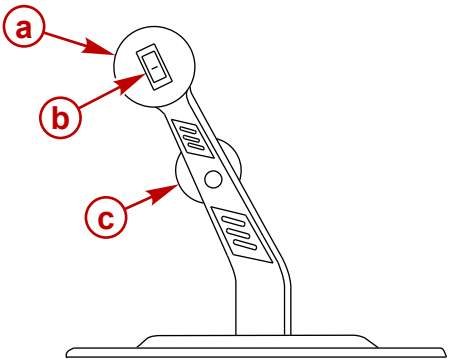
Remote Controls (Console Mounted Zero Effort)

1. Control the throttle by moving the longer control lever(s) or, to increase speed, push the control lever forward. Detents give the movement of the lever a notched, precise feel. The detents also help hold the lever at the desired engine RPM to reduce operator fatigue.

⚠ CAUTION

Avoid possible engine damage. Never shift the unit into or out of gear unless the engine is at idle RPM.

2. Control shifting by moving the shorter control lever(s). This control shifts the unit into gear with full lever movement. Move the lever forward to engage the forward gear. Move lever backward to engage reverse gear. Place the lever in the center position to shift to neutral. Shifting should occur only with the engine at idle speed. Always move to the desired gear position with a quick, firm motion. The control handle should be adjusted by your dealer to engage forward, reverse, and neutral when the lever is at the appropriate detent.



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a - Throttle control lever
b - Shift control lever
c - Power trim switch

3. See **Power Trim** section for detailed power trim operating procedures.

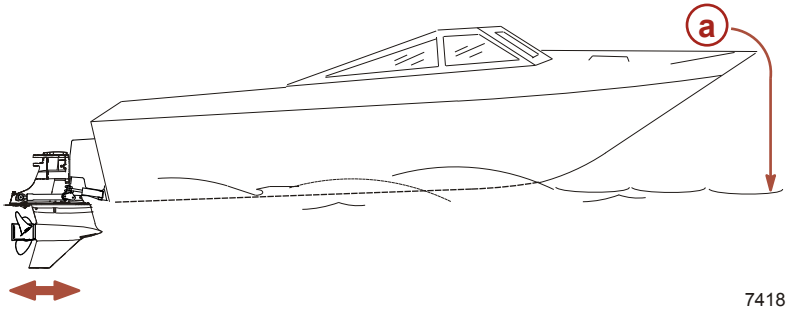
Power Trim

Power trim allows the operator to adjust the drive angle while underway to provide the ideal boat angle for varying load and water conditions.

⚠ CAUTION

Avoid excessive wear on the U-joint/input shaft. The VI drive does not have a trim limit switch. Depressing the trim or trailer buttons allows the drive to be tilted to its full extension without stopping at a preset trim limit. The drive's position should be monitored with the trim gauge(s) so that the drive is not trimmed excessively.

In most cases, best overall performance is obtained with the drive unit adjusted so the boat bottom will run at a 3° to 5° angle to the water.

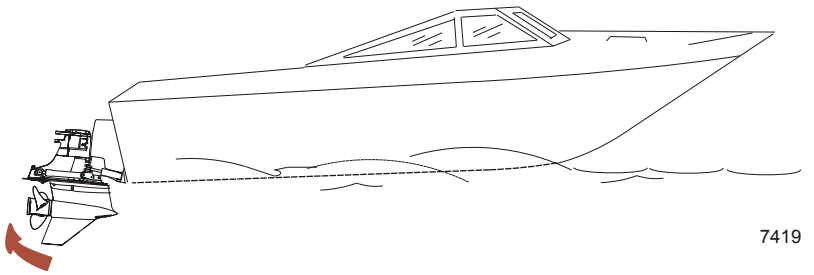


a - Boat bottom at 3° to 5° angle with water

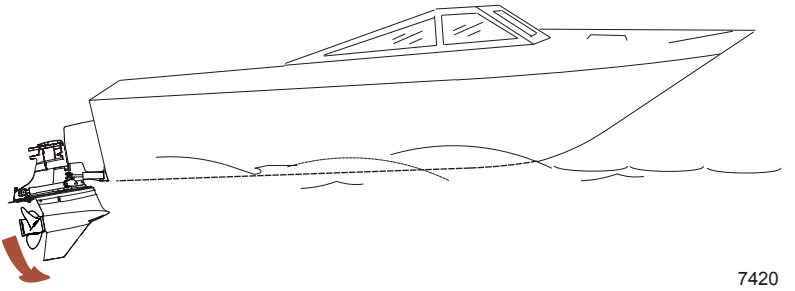
Trimming Drive Unit Up/Out Can:

- Generally increase top speed.
- Increase clearance over submerged objects or a shallow bottom.
- Cause the boat to accelerate and plane off slower.

- In excess, cause boat porpoising (bouncing) or propeller ventilation.



Trimming Drive Unit Down/In Can:



- Help the boat accelerate and plane off quicker.
- Generally improve the ride in choppy water.
- In most cases, reduce boat speed.
- If in excess, lower the bow of some boats to a point at which they begin to plow with their bow in the water while on plane. This can result in an unexpected turn in either direction, called bow steering or over steering. if any turn is attempted or if a significant wave is encountered.

Power Trim Sender Conversion Module (If Installed)

- Trim limit is determined by the sender.
- Trailer position is achieved by trimming up with key in the "OFF" position.

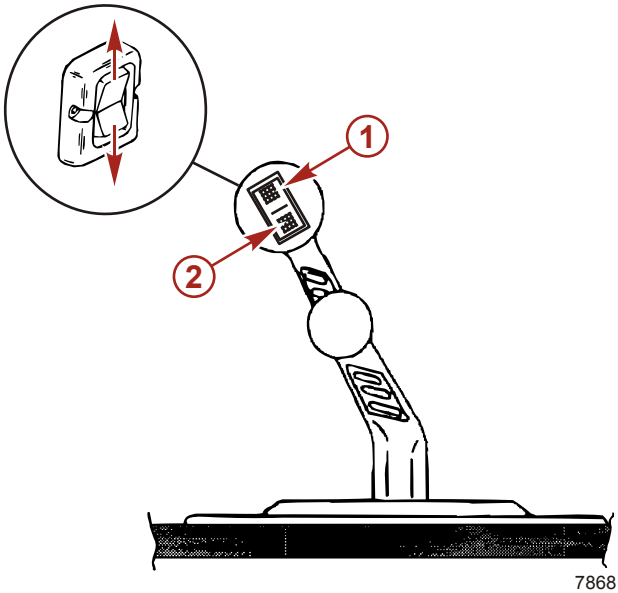
ZERO EFFORT CONTROL WITH INTEGRAL TRIM SWITCH

The VI drive does not have an electrical trim limit switch. Therefore the following precautions must be observed.

⚠ CAUTION

Avoid twisting or binding dual engine tie bars. Damage to the tie bar and sterndrives could occur. Always raise or lower the sterndrive units evenly.

NOTE: *The word "trim" is usually considered the first 20° up/out movement from vertical position.*



a - Trailering and trimming up/out position - Press (top) up/out portion of switch until drive unit reaches desired trim/trailering position.

b - Trim drive unit in/down position - Press (bottom) in/down portion of switch until drive unit reaches desired trim position.

OPERATION

Starting, Shifting and Stopping

⚠ WARNING

Avoid fire or explosion. Before starting the engine, operate the bilge blower for at least five minutes to remove any explosive fumes from the engine compartment. If the boat is not equipped with a bilge blower, open the engine hatch and leave it open while starting the engine.

NEW ENGINES OR ENGINES COMING OUT OF STORAGE

See **Power Package Recommissioning.**

IMPORTANT: Observe the following:

- **Do not start the engine without supplying water to the seawater pickup pump (to prevent pump or engine damage).**
- **Do not operate the starter motor continuously for more than 30 seconds.**
- **Never shift the drive unit unless the engine is at idle RPM.**

Perform the following as appropriate:

☐ Check all items listed in **Operation Chart.**

☐ Perform any other necessary checks, as indicated by your dealer, or specified in your boat owner's manual.

☐ Place the drive unit in full the down/in position.

☐ Place the control handle in neutral.

COLD OR WARM ENGINE

EFI engines require no throttle advance to start. The boat can be operated after the engine has started and is idling smoothly.

NOTE: *Engines that have not been started for extended periods or have had fuel filter changes may not stay running on the first few initial attempts to start. Do not advance the throttle to keep the engine running. Continue to restart the engine until it idles smoothly which means the fuel system is primed. Allow the engine to warm up to 54 °C (130 °F) before advancing the throttle. Do not operate at full throttle until the engine reaches an oil temperature of 60 °C (140 °F).*

OPERATION

FLOODED ENGINE

Move control/throttle lever to half throttle. Be prepared to decrease engine speed to 1000 - 1500 RPM as soon as engine starts.

STARTING PROCEDURE

1. Turn the key switch to "START." Release the key when the engine starts and allow the switch to return to the "RUN" position.
2. Check the oil pressure gauge immediately after the engine starts. If oil pressure is not within the specified range, see **Specifications**, stop the engine immediately, and determine cause.
3. If the engine is cold, make sure the engine is idling smoothly before operating the boat.
4. After the engine has warmed up, check the water temperature gauge to ensure that the engine temperature is not abnormally high. If it is, stop the engine immediately and determine cause.
5. Ensure that the charging system is functioning correctly.
6. Observe the power package for fuel, oil, water, and exhaust leaks.

Operation Chart

1. **Before Starting**
   - ☐ Open the engine hatch.
   - ☐ Turn battery switch "ON," if equipped.
   - ☐ Operate bilge blowers, if equipped.
   - ☐ Open fuel shut off valve.
   - ☐ Open seacock, if equipped.
   - ☐ Perform all other checks specified by your dealer and/or boat builder.
2. **After Starting**
   - ☐ Observe all gauges to check condition of engine. If not normal, stop engine.
   - ☐ Check for fuel, oil, water, fluid and exhaust leaks, etc.
   - ☐ Check shift and throttle control operation.

- ☐ Check steering operation.

3. **While Underway**
   - ☐ Observe all gauges to monitor engine condition.
4. **After Stopping**
   - ☐ Shift to neutral. Turn ignition key "OFF."
   - ☐ Turn battery switch "OFF," if equipped.
   - ☐ Close fuel valve.
   - ☐ Close seacock.
   - ☐ Flush cooling system if in saltwater area.

Freezing Temperature Operation

IMPORTANT: If boat is operated in freezing temperatures, ensure that closed coolant is rated for the temperature range in which it is to be used. The seawater section of the engine must be drained after use to prevent freezing. Damage caused by freezing is not covered by Mercury Racing's Limited Warranty.

Drain Plug and Bilge Pump

The engine compartment in your boat is a natural place for water to collect. For this reason, boats are normally equipped with a drain plug and/or a bilge pump. It is very important to check these items on a regular basis to ensure that the water level does not rise to come in contact with your power package. Engine components will be damaged if submerged. Damage caused by submersion is not covered by the Mercury Racing Limited Warranty.

The bilge drain can be used to change crankcase oil. Refer to the **Maintenance** section.

Launching And Boat Operation Care

NOTICE
Some boating maneuvers can introduce water into the engine through the exhaust system, causing severe engine damage. Be careful when unloading a boat from its trailer, slowing down rapidly, backing up rapidly, and stopping suddenly.

In any of the situations described in the preceding caution, water entering the engine could cause severe damage to internal parts. Refer to **Attention Required After Submersion** in the **General Information** section of this manual.

CONDITIONS AFFECTING OPERATION

Weight Distribution

Positioning of weight (passengers and gear) inside the boat has the following effects:

Shifting weight to rear (stern) may:

- Increase speed and engine RPM.
- Cause the boat to porpoise.
- Cause the bow to bounce in choppy water.
- Increase the danger of a following wave splashing into the boat when coming off plane.

Shifting weight to front (bow) may:

- Improve ease of planing.
- Improve rough water ride.
- Cause the boat to veer back and forth (bow steer).

Bottom Of Boat

To maintain maximum speed, ensure that the bottom of the boat is:

- Clean and free of barnacles and marine growth.
- Free of distortion and nearly flat where it contacts the water.
- Straight and smooth both fore and aft.

Marine vegetation may accumulate when the boat is docked, clogging water inlets and causing the engine to overheat. This growth must be removed before operation.

Cavitation

Cavitation occurs when water flow cannot follow the contour of a fast-moving, underwater object, such as a gear housing or propeller. Cavitation permits the propeller to speed up, but the boat speed to reduce. Cavitation can seriously erode the surface of the gear housing or propeller. Common causes of cavitation are:

- Weeds or other debris snagged on propeller or gear housing.
- Bent propeller blade or damaged gear housing skeg.
- Raised burrs or sharp edges on propeller or gear housing.

CONDITIONS AFFECTING OPERATION

Ventilation

Ventilation occurs when surface air or exhaust gases surround the propeller, causing propeller speed-up (slippage) and a decrease in boat speed. Excessive ventilation is annoying and usually caused by:

- A drive unit trimmed out too far.
- A damaged propeller or gear housing, allowing exhaust gases to escape between propeller and gear housing.
- A drive unit installed too high on the transom.

Propeller Selection

IMPORTANT: Choosing the correct propeller allows the engine to run at its specified maximum wide-open-throttle RPM. Use an accurate service tachometer to verify engine operating RPM.

It is the boat manufacturer and/or the selling dealer's responsibility to equip the power package with the correct propeller(s). Specified engine wide-open-throttle (WOT) and operating RPM range are listed in **Specifications.**

IMPORTANT: All Mercury Racing engines have a RPM rev-limiter that is set to an upper (or limited) RPM. This limit is slightly above the normal operating range of the engine and is designed to help prevent damage from excessive engine RPM. Once the RPM drops into the recommended operating RPM range, normal engine operation resumes.

Select a propeller that allows the engine to operate in the upper half of the recommended full throttle RPM range with the boat normally loaded (refer to **Specifications**).

If full throttle operation is below the recommended range, change the propeller to prevent loss of performance and possible engine damage. On the other hand, operating an engine above the recommended operating RPM range causes higher than normal wear or damage. Generally, there is a 200 - 300 RPM change between propeller pitches.

RPM loss may require changing to a lower pitch propeller due to the following conditions:

- Operating in warmer weather and greater humidity.

- Operating in a higher elevation.
- Operating with a damaged propeller or dirty boat bottom.
- Operating with increased load (additional passengers, pulling skiers, etc.).

Conditions That Lower Engine Performance

The following conditions lower engine performance and cannot be compensated by the engine fuel or electronic management systems.

- Above sea level elevations
- High temperature.
- Low barometric pressure.
- High humidity.

The conditions listed above reduce air density to the engine which in turn reduces the following:

- Boost pressure on supercharged engines
- Horsepower and torque throughout the RPM range
- Peak RPM
- Cranking compression

EXAMPLE: An engine running at an elevation of 2,438 m (8,000 ft) will have over a 30% power loss while engine power on a hot and humid day can be reduced by as much as 14%. These losses apply to both normally aspirated and supercharged engines.

Compensating for power robbing conditions:

- Switch to a lower pitch propeller.
- Change the gear ratio.

Some boat performance can be regained by dropping to a lower pitch propeller, but engine performance will remain lower. In some cases, a gear ratio reduction may be more beneficial. To optimize engine performance, prop the engine to allow it to allow operation at or near the top end of the recommended maximum RPM range at wide open throttle with a normal boat load.

Other advantages to propeller or gear ratio changes:

- Reduces the possibility of detonation.
- Enhances overall reliability and durability of the engine.

Servicing High Horsepower Engines

All high performance engines require frequent maintenance and inspection schedules due to the extreme duty cycles and related stress these products endure. Failure to follow the detailed maintenance and service schedule as written and supplied by Mercury Marine could lead to catastrophic engine failure and increased owner expense.

Service Responsibilities

OWNER/OPERATOR RESPONSIBILITIES

It is the owner/operator's responsibility to perform the following:

- Perform all safety checks.
- Make sure lubrication and maintenance instructions are complied with for safe operation.
- Return the unit to an authorized Mercury Marine dealer for a periodic checkup.
- Perform normal maintenance service using authorized replacement parts.

Proper maintenance and care of your power package will ensure optimum performance and dependability, and will keep your overall operating expenses at a minimum. See your authorized Mercury Marine dealer for service aids.

DEALER RESPONSIBILITIES

In general, a dealer's responsibilities to the customer include pre-delivery inspection and preparation. These include:

- Completing a Warranty Registration Card provided with the product and mailing it to the factory or by using the electronic registration system provided by Mercury Marine for the selling dealer.
- Properly equipping the boat.
- Making certain that the Mercury Marine power package and other equipment are in proper operating condition prior to delivery.
- Making all necessary adjustments for maximum efficiency.
- Familiarizing the customer with the on-board equipment.

- Explaining and demonstrating the operation of the power package and boat.
- Providing the customer with a copy of a **Pre-delivery Inspection Checklist** prior to delivery.

Replacement Service Parts

⚠ WARNING

Avoid fire or explosion hazard. Electrical, ignition, and fuel system components on Mercury Marine products comply with U.S. Coast Guard rules to minimize risk of fire or explosion. Do not use replacement electrical or fuel system components that do not comply with these rules. When servicing the electrical and fuel systems, properly install and tighten all components.

Marine engines are expected to operate at or near full throttle for most of their life. They are also expected to operate in fresh and saltwater environments. These conditions require numerous special parts. Care should be exercised when replacing marine engine parts, as specifications are quite different from those of the standard automotive engine.

For example, one of the most important, and probably the least suspected special replacement part, is the cylinder head gasket. Since saltwater is highly corrosive, the steel-type automotive head gasket cannot be used. A marine engine head gasket uses special materials to resist corrosive action.

Since marine engines must be capable of running at or near maximum RPM much of the time, special valve springs, valve lifters, pistons, bearings, camshafts and other heavy-duty moving parts are required for long life and peak performance.

These are but a few of the many special modifications that are required in Mercury Marine engines to provide long life and dependable performance.

Do-It-Yourself Maintenance Suggestions

If you are one of those persons who likes to do-it-yourself, here are some suggestions for you.

- Present-day marine equipment, such as your Mercury Marine power package, are highly technical pieces of machinery. Electronic ignition and special fuel delivery systems provide greater fuel economies, but are more complex for the untrained mechanic.
- Do not attempt any repairs that are not covered in this manual unless you are aware of the precautions (Cautions and Warnings) and procedures required. Your safety is of our concern.
- If you attempt to service the product yourself, we suggest you order the service manual for that model. This manual outlines the correct procedures to follow. It is written for the trained mechanic, so there may be procedures you don't understand. Do not attempt repairs if you do not understand the procedures.
- Special tools and equipment may be required to perform some repairs. Do not attempt these repairs unless you have these special tools and/or equipment. You can cause damage to the product in excess of the cost a dealer would charge you for the repair.
- If you partially disassemble an engine or drive assembly and are unable to repair it, the dealer's mechanic must re-assemble the components and test to determine the problem. This will cost you more than taking it to the dealer immediately upon having a problem. It may be a very simple adjustment to correct the problem.
- Do not telephone the dealer, service office or the factory to attempt for them to diagnose a problem or request the repair procedure. It is difficult for them to diagnose a problem over the telephone.
- Your authorized Mercury Marine dealer is there to service your power package. They have qualified factory-trained mechanics.

Mercury Marine recommends that you have the dealer do periodic maintenance checks on your power package. Have them winterize it in the fall and service it before the boating season. This will reduce the possibility of any problems occurring during your boating season when you want trouble-free boating pleasure.

MAINTENANCE

IMPORTANT: Refer to the Maintenance Charts (on following pages) for a complete listing of all scheduled maintenance to be performed. Some listings can be done by the owner/operator, while others should be performed by an authorized Mercury Marine dealer. Before attempting maintenance or repair procedures not covered in this manual, Mercury Marine recommends purchasing a Mercury Marine Service Manual.

Maintenance Charts

NOTE: *The following maintenance charts should be used as a guideline. Depending on the type of boat, optional equipment, the application and/or conditions of use, it may be required that the maintenance intervals be modified. Work closely with your authorized Mercury Marine dealer to develop a specific maintenance schedule designed for your application.*

ENGINE MAINTENANCE SCHEDULE

Interval	Task
Check prior to every use and every 3 hours of operation	Engine Crankcase Oil - Check level
	Seawater Filter - Check for debris or leakage
	Power Steering Fluid - Check level
	Transmission Fluid - Check level
	Supercharger - Check oil level in sight-glass
	Fuel Pump Sight Tube - Ensure that no fuel is present. Vapor or condensation is acceptable
After every use in salty, brackish, or mineral-laden water	Flush the seawater section of the cooling system
Every 25 hours of operation or once every 30 days, whichever occurs first	Battery - Check water level and inspect for corrosion or damage
	Inspect external water pickups - Check for marine growth or debris
	Sea Pump/Fuel Pump - Check the oil level and inspect for fuel contamination

MAINTENANCE

Interval	Task
Saltwater use: Every 50 hours of operation or 60 days, whichever occurs first	Power Package Exterior Surfaces - Spray with rust preventive
Every 50 hours or once a year, whichever occurs first	Perform all 25 hour maintenance items
	Engine Oil and Filter - Change
	Serpentine and Supercharger Belts - Inspect condition and check tension
	Cooling System Hoses and Clamps - Inspect for damage and deterioration. Check clamps for tightness
	Electrical System - Check for loose or damaged wiring
	Continuity Circuit - Check components for loose connections, broken or frayed wires
	Shift and Throttle Cable and Linkage - Lubricate and inspect for loose, damaged or missing parts
	Engine Exhaust System - Inspect for damage, deterioration and restrictions. Check clamps for tightness
	Water Separator Filter - Inspect (If Installed on boat)
	Transmission Fluid - Change
	Engine Driveshaft and Slip Yoke - Lubricate (drive-line models)
Freshwater use: Twice a year	Power Package Exterior Surfaces - Spray with rust preventative

MAINTENANCE

Interval	Task
Every 100 hours of operation or once a year, whichever occurs first	Perform all 25 hour and 50 hour maintenance items
	Supercharger - Change oil
	Power Package Exterior Surfaces - Clean and paint
	Engine Cylinder Compression - Check
	Engine and Power Steering Oil Coolers - Clean the seawater sections
	Positive Crankcase Ventilation (PCV) Valve - Replace
	Flame Arrestor and Crankcase Ventilation Hose - Inspect, clean or replace
	Engine Alignment - Check
	Exhaust - Check for signs of water leakage
	Exhaust System Internal and External Shutters - Inspect
	Engine Output Shaft, Bearing, and Pilot Bushing - Inspect and lubricate
Every 100 hours of operation or recommissioning after storage	Peform 25, 50, and 100 hour maintenance items
	Fuel filters - Replace
Every 100 hours of operation or once a season or whenever insufficient seawater flow is suspected causing the operating temperature to exceed normal	Seawater Pick-up Pump - Disassemble and inspect
Every 200 hours of operation	Peform 25, 50, and 100 hour maintenance items
	Ignition System - Clean and inspect condition. Adjust or replace spark plugs as needed
Every 5 years	Flush the closed cooling system and refresh coolant

MAINTENANCE

DRY SUMP SIX DRIVE MAINTENANCE SCHEDULE

Interval	Task
Check prior to use and every 3 hours of operation.	Drive, Transom, and Propeller - Inspect.
	Lower Gear Housing Oil - Check level.
	Power Trim Pump Oil - Check level and for any water contamination. Replace if necessary.
	Anodes - Inspect for erosion.
Initial break-in at 25 hours.	Drive - Change Oil and filter
Every 25 hours of operation or every 90 days, whichever occurs first.	Tie-bar Mounting Bracket Nuts - Inspect and tighten to specifications as needed.
	Propeller Shaft - Lubricate.
	Propeller Nut - Retighten.
	Anodes - Inspect for erosion.
	Sterndrive - Inspect, clean, and spray with rust preventative.
Every 50 hours of operation.	Perform 25 Hour Maintenance Items.
	Drive Mounting Nuts - Tighten to 136 Nm (100 lb. ft.)
	Steering System - Inspect for loose, damaged or missing parts. Lubricate the steering cylinder pivot points.
Every 100 hours of operation or annually, whichever occurs first	Peform 25 and 50 Hour Maintenance Items.
	Drive Unit Bellows and Clamps - Inspect.
	Sterndrive Unit Input Splines (Internal and External) - Lubricate with Optimol Paste White T Grease.
	Drive Input Shaft U-joints - Lubricate.
	Drive - Change Oil[1.]
	Transom Input Shaft Bearing Housing - Change the oil.[1.]

1. Severe duty requires more frequent service.

Interval	Task
Every 200 hours of operation or once a year, whichever occurs first.	Peform 25, 50, and 100 Hour Maintenance Items.
	Engine Alignment - Check.
	Propeller Shaft Bearing - Inspect by measuring shaft deflection.
Every 200 hours of operation[1].	Drive - Change oil and filter
Every rebuild	Drive - Change oil and filter

Changing Fluids

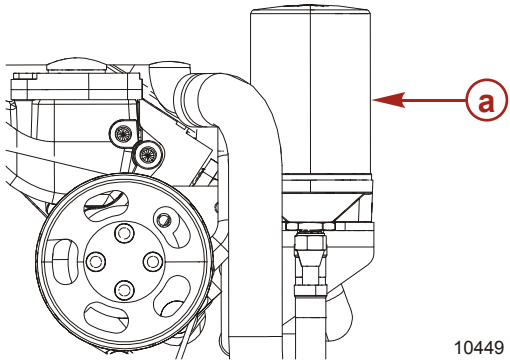
CHANGING CRANKCASE OIL AND FILTER (BOAT IN THE WATER)

⚠ CAUTION

ENVIRONMENTAL HAZARD! Discharge of oil or oil waste into the environment is restricted by law. Do not spill oil or oil waste into the environment when using or servicing your boat. Contain and dispose of oil or oil waste as directed by local authorities.

IMPORTANT: Change oil when the engine is warm from operation. Warm oil flows more freely, carrying away more impurities. Use only recommended motor oil (see *Specifications*).

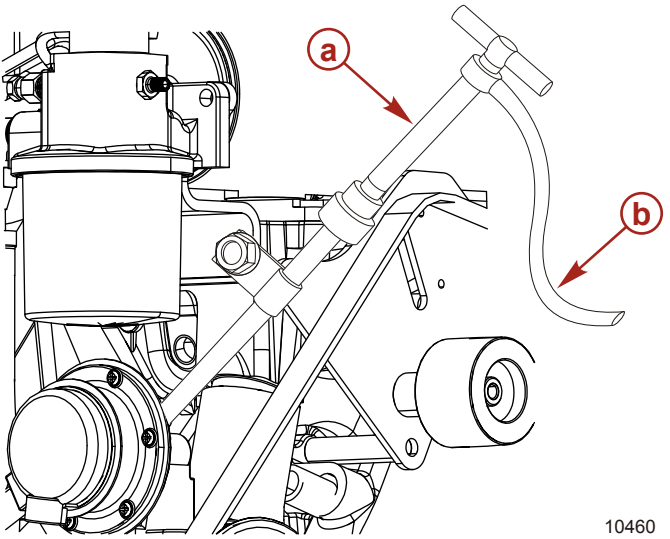
NOTE: *To allow the oil to drain from the filter, loosen the filter just enough to break the internal vacuum (approximately 1/4 turn). Then turn the filter back clockwise until the oil filter seal makes light contact with the housing (approximately an 1/8 turn) to prevent unwanted oil leakage. Let the oil drain back into the system for 15 minutes prior to complete removal of the filter.*



a - Crankcase oil filter

1. With the engine at normal operating temperature, remove the dipstick.
2. Install a crankcase oil pump onto the dipstick tube.

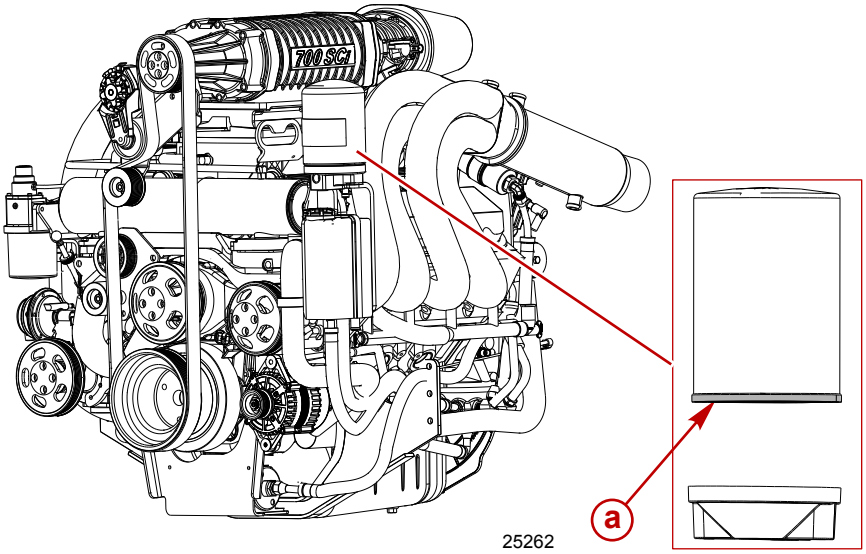
3. Insert the hose end of the crankcase oil pump into an appropriate container and pump out the oil until the crankcase is empty.



a - Crankcase oil pump
b - Crankcase oil pump hose

4. Remove the crankcase oil pump.
5. Place a container below the oil filter.
6. Remove the oil filter from the adaptor and discard the old oil filter and old sealing ring.
7. Coat the sealing ring on the new filter with new motor oil and install the new sealing ring and filter.

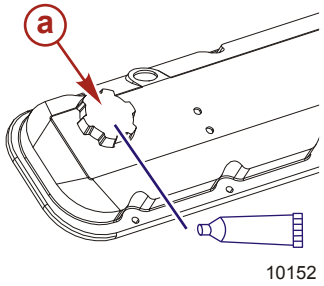
8. Tighten the filter securely by hand. Do not overtighten.



a - Oil filter sealing ring

9. Remove the oil filler cap (port or starboard).
10. Add enough oil to bring the oil level into the "OK RANGE" on the dipstick; approximately 8 L (8.5 qts.).

IMPORTANT: Engine crankcase capacity is 8 L (8.5 qts.). However, due to possible incomplete oil pump out, always use the dipstick to confirm proper oil level and prevent overfilling.



a - Crankcase oil fill cap

Tube Ref No.	Description	Where Used	Part No.
	Kendall GT-1 SAE 20W50	Engine crankcase	Obtain Locally

11. Start the engine and check for proper oil pressure. Allow the engine to idle for one minute and verify that no oil is leaking.
12. Shut off the engine.
13. Wait a few minutes for the engine oil to return to the crankcase and then check the oil level. If the oil level is low, add enough oil to bring it within the "OK RANGE" on the dipstick. Do not overfill.

CHANGING CRANKCASE OIL AND FILTER (BOAT OUT OF THE WATER)

⚠ WARNING

If the engine is to be tested with boat out of the water, the propeller must be removed to avoid injury.

⚠ CAUTION

Avoid engine damage from overheating. If the engine is operated above 1500 RPM during flushing, suction created by the seawater pickup pump may collapse the flushing water hose causing the engine to overheat.

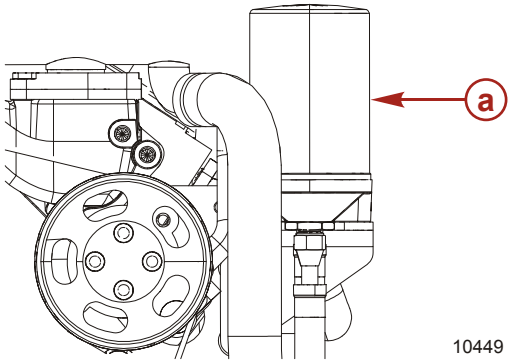
⚠ CAUTION

ENVIRONMENTAL HAZARD! Discharge of oil or oil waste into the environment is restricted by law. Do not spill oil or oil waste into the environment when using or servicing your boat. Contain and dispose of oil or oil waste as directed by local authorities.

IMPORTANT: Use only recommended motor oil, see *Specifications.* Change oil when the engine is warm from operation. Warm oil flows more freely, carrying away more impurities. Attach a water hose to the boat's external water pickup, to allow water to be supplied to the engine block during engine warm-up. See the boat owner's manual for information on connecting a water supply to the boat's external water pickup.

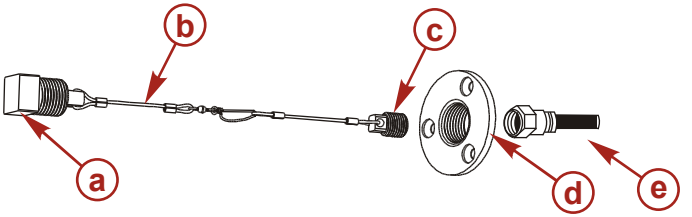
1. Attach a water hose to the boat's external water pickup, to allow water to be supplied to the engine block during engine warm-up.
2. Open the water tap to supply enough flow to the sea pump so that suction created by the sea pump, does not collapse the supply hose.
3. Place the remote control in neutral position and start the engine. Operate the engine at idle speed, in neutral, until the engine reaches normal operating temperature.
4. Stop the engine and shut off the water.

NOTE: *To allow the oil to drain from the filter, loosen the filter just enough to break the internal vacuum (approximately 1/4 turn). Then turn the filter back clockwise until the oil filter seal makes light contact with the housing (approximately an 1/8 turn) to prevent unwanted oil leakage. Let the oil drain back into the system for 15 minutes prior to complete removal of the filter.*



a - Crankcase oil filter

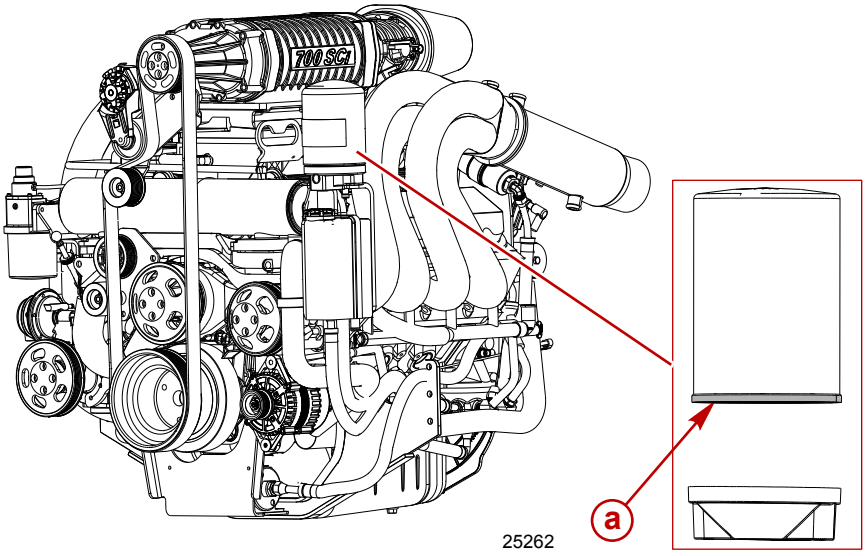
5. Remove the bilge plug. The oil drain hose is tethered to the plug.



a - Bilge drain plug
b - Tether
c - Oil drain plug
d - Bilge drain flange
e - Oil drain hose

6. Pull the oil drain hose through the bilge drain flange.
7. Place an appropriate container directly under the oil drain hose.
8. Using two wrenches, separate the oil drain hose plug from the oil drain hose and allow crankcase oil to drain until empty.
9. Place a container below the oil filter.
10. Remove the oil filter from the adaptor and discard the old oil filter and sealing ring.

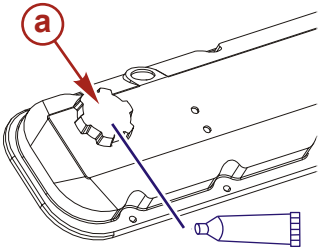
11. Coat the sealing ring on the new filter with new motor oil. Install the sealing ring and filter. Tighten the filter securely by hand. Do not overtighten.



a - Oil filter sealing ring

12. Using two wrenches, connect the oil drain hose plug to the oil drain hose and place it back into the boat.
13. Tighten the bilge drain plug.
14. Remove the oil filler cap (port or starboard). Add oil to bring the oil level into the "OK RANGE" on the dipstick; approximately 8 L (8.5 qts.).

IMPORTANT: Engine crankcase capacity is 8 L (8.5 qts.).However, always use the dipstick to confirm proper oil level.



a - Crankcase oil filler cap

Tube Ref No.	Description	Where Used	Part No.
	Kendall GT-1 SAE 20W50	Engine crankcase	Obtain Locally

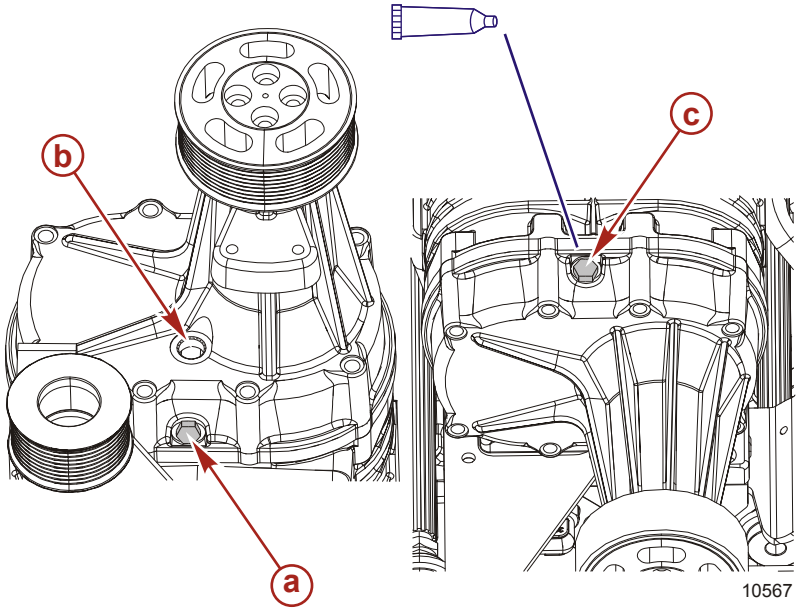
15. Turn on the water supply hose to the water pick-up.
16. Start the engine and check for proper oil pressure. Allow the engine to idle for one minute and verify that no oil is leaking.
17. Shut off the engine and the water to the water pick-up attachment.
18. Wait a few minutes for the engine oil to return to the crankcase and then check the oil level. If the oil level is low, add enough oil to bring it within the "OK RANGE" on the dipstick. Do not overfill.
19. Remove the external water supply.

CHANGING SUPERCHARGER GEARCASE OIL

IMPORTANT: Change the supercharger oil when the engine and supercharger are warm from operation. Warm oil flows more freely, carrying away more impurities. Use only the recommended oil in the supercharger, see *Specifications.* If the oil level in the sight-glass has increased, decreased, or changed to an abnormal color, it would indicate an internal problem with the supercharger. Contact your authorized Mercury Marine dealer.

1. Attach a water hose to the boat's external water pickup, to allow water to be supplied to the engine block during engine warm-up.
2. Open the water tap to supply enough flow to the sea pump so that suction created by the sea pump, does not collapse the supply hose.
3. Place the remote control in neutral position and start the engine. Operate the engine at idle speed, in neutral, until the engine reaches normal operating temperature.
4. Stop the engine and shut off the water.
5. Remove the fill plug from the top of the supercharger gearcase.
6. Place a suitable container under the drain plug in the bottom of the supercharger gearcase.
7. Remove the drain plug and drain the oil.
8. Clean and inspect the plug O-rings, the gearcase fill and drain hole threads and the plug threads.
9. Install the drain plug in the gearcase and torque to specifications.
10. Fill the gearcase through the top fill hole with approximately 177 milliliters (6 oz.) of oil. The oil should cover half of the sight-glass in the gearcase.

11. Install the fill plug and torque to specifications.



a - Drain plug
b - Sight-glass
c - Fill plug

Description	Nm	lb. in.	lb. ft.
Fill and drain plugs, supercharger gearcase	13.5		10

Tube Ref No.	Description	Where Used	Part No.
	Castrol Syntec 5W-50 Synthetic Oil	Supercharger gearcase	Obtain Locally

CHANGING ENGINE COOLANT

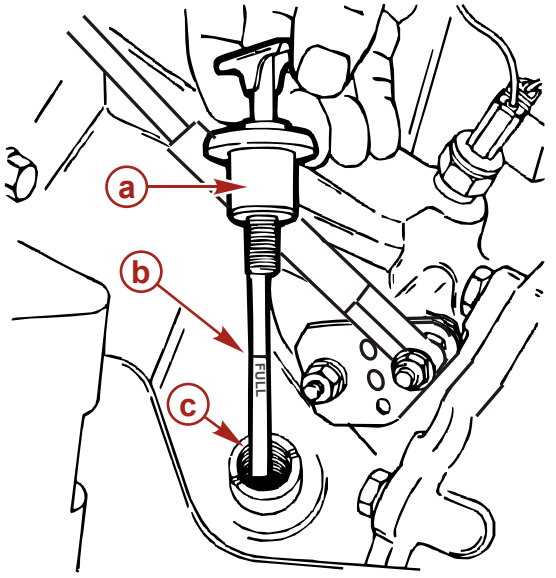
Contact your authorized Mercury Marine dealer.

CHANGING TRANSMISSION OIL

1. Place a suitable container (minimum 2.8 liter [3 qt.] capacity) under the transmission lower fitting.
2. Remove both the upper and lower transmission-to-oil-cooler lines and drain.

3. Remove the check valve assembly from the lower fitting and drain the transmission fluid.
4. Re-install the check valve assembly and the upper and lower oil lines.
5. Fill the transmission through the dipstick tube with approximately 1.9 liters (2 qt.) of Type F or FA transmission fluid.
6. Attach a water hose to the boat's external water pickup, to allow water to be supplied to the engine block during engine warm-up.
7. Open the water tap to supply enough flow to the sea pump so that suction created by the sea pump, does not collapse the supply hose.
8. Start the engine and let it run for at least two minutes at idle, shifting the transmission from forward to reverse several times.

9. Stop the engine, shut off the water and check the transmission oil level with the dipstick. If additional oil is required, add it through the dipstick tube to bring the level up to the "FULL" mark.



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a - Dipstick
b - "FULL" mark
c - Dipstick tube

Tube Ref No.	Description	Where Used	Part No.
	Type F or FA Transmission Fluid	Transmission	Obtain Locally

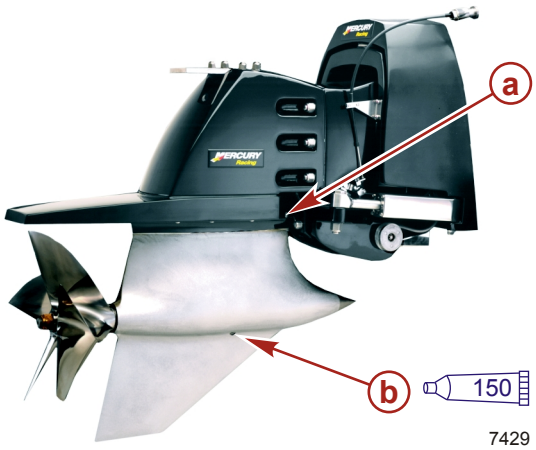
CHANGING DRIVE UNIT GEAR LUBE

IMPORTANT: Use only Torco MTF Gear Oil in drive unit.

1. Remove propeller, place drive unit so propeller shaft is level.
2. Remove fill/drain screw and sealing washer, and vent screw and sealing washer from gear housing.

IMPORTANT: If any water drained, or if gear lube appears milky, the drive unit is leaking and should be checked immediately by your authorized Mercury MerCruiser Dealer.

3. Fill the drive unit, through the fill/drain hole, with Torco MTF Gear Oil until an air-free stream of lubricant flows from gear oil level hole of gear housing.



a - Top vent screw
b - Fill/drain screw

Tube Ref. No.	Description	Where Used	Part No.
	Torco MTF Gear Oil	Drive unit	92-849684-1

4. Install vent screw and washer and remove tube from fill/drain hole. Quickly install sealing washer and fill/drain screw. Tighten securely.
5. Check oil level after first test trial. Refill if necessary.

⚠ WARNING

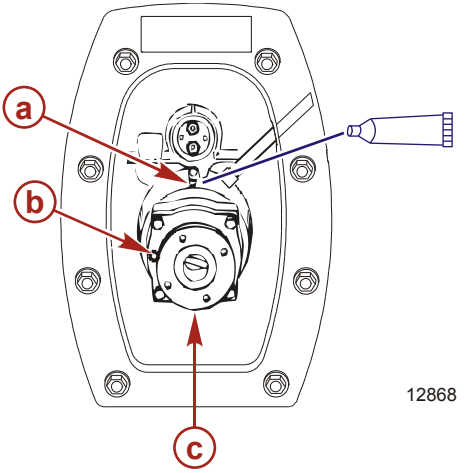
Avoid damage to the sterndrive assembly. Do not overfill the Dry Sump Six (VI) Drive.

CHANGING DRIVE UNIT NOSE CONE FILTER

This procedure requires special tools. Contact your authorized Mercury Marine dealer.

CHANGING TRANSOM INPUT SHAFT BEARING HOUSING GEAR LUBE (DRIVE-LINE MODELS)

1. Remove 3 pipe plugs from the transom input shaft bearing housing. Allow gear lube to drain completely.



a - Top pipe plug (Fill)
b - Middle pipe plug (Check level)
c - Bottom pipe plug (Drain)

Tube Ref No.	Description	Where Used	Part No.
	Torco MTF Gear Oil	Input shaft housing	Obtain Locally

2. Re-install bottom pipe plug.
3. Fill the input shaft housing with Torco MTF Gear Lube through the top plug opening until gear lube flows from the middle plug opening.
4. Install the pipe plugs into the transom input shaft bearing housing.

⚠ WARNING

Avoid damage to the sterndrive assembly. Do not overfill the Dry Sump Six (VI) Drive.

IMPORTANT: Re-check the transom input shaft bearing housing gear lube level after the first use. The gear lube should be to the middle plug level. Gear lube level will rise and fall during drive unit operation due to gear lube expansion; check level when drive unit is cool and engine is shut down.

Checking Fluid Levels

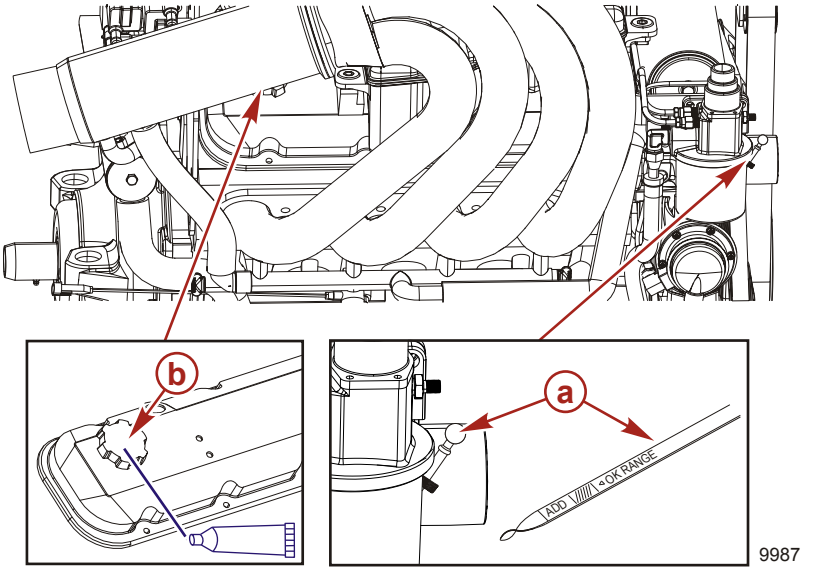
CHECKING CRANKCASE OIL

IMPORTANT: Check the engine crankcase oil at the intervals specified in the Maintenance Chart.

NOTE: *Oil consumption is highest at wide-open-throttle and decreases substantially as engine speed reduces. Big block, high-performance engines may use up to 1qt. of oil in 1-5 hours, if the engine is operated continuously at the upper end of the RPM range.*

1. Stop the engine.
2. Allow approximately five minutes for the oil to drain into the oil pan. The boat must be at rest in the water or at the approximate angle that it would be if setting in the water.
3. Remove the dipstick, wipe it clean, and re-install it all the way into the dipstick tube.
4. Remove the dipstick and check the oil level. The oil level must be between the "OK RANGE" and the "ADD" marks.
5. If the oil level is at or below the "ADD" mark, remove the oil filler cap (port or starboard). Add enough oil to bring the level into the "OK RANGE" on the dipstick. Do not overfill.

IMPORTANT: Do not overfill the crankcase with oil.



a - Oil level dipstick
b - Crankcase oil filler cap

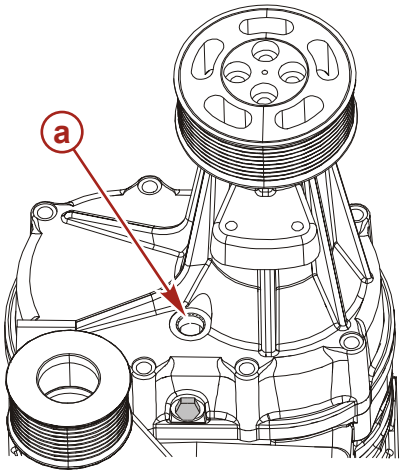
Tube Ref No.	Description	Where Used	Part No.
	Kendall GT-1 SAE 20W50	Engine crankcase	Obtain Locally

CHECKING SUPERCHARGER GEARCASE OIL

IMPORTANT: The oil level covers approximately half of the sight-glass located in the front cover of the supercharger. If the oil level increases, decreases, or changes in color, expect a problem within the supercharger. Contact your authorized Mercury Marine dealer.

1. Stop the engine.
2. Allow approximately 5 minutes for the oil in the supercharger case to settle and the sight-glass to clear.

3. Visually inspect the level and quality of the oil in the sight-glass gage. The oil should be covering approximately half of the sight-glass.



7356

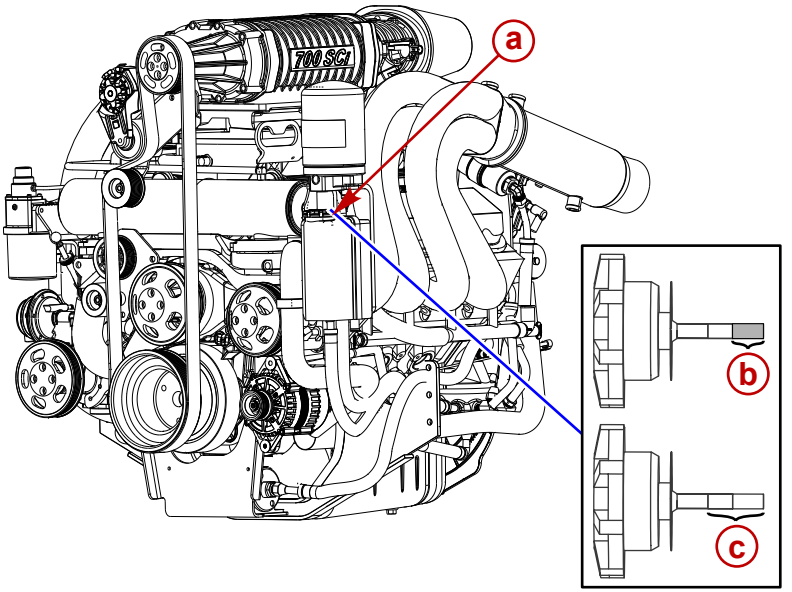
a - Sight-glass

CHECKING POWER STEERING PUMP FLUID

IMPORTANT: If fluid is not visible in the reservoir, contact your authorized Mercury Marine dealer.

1. Stop the engine and turn the drive unit straight ahead.
2. Remove the fill cap/dipstick and observe the level. Ensure that the oil level is between the lower and upper marks.

3. Add power steering fluid to bring the oil level up to the full mark on the cap/dipstick if required.



a - Reservoir cap
b - Add fluid mark
c - Full fluid mark

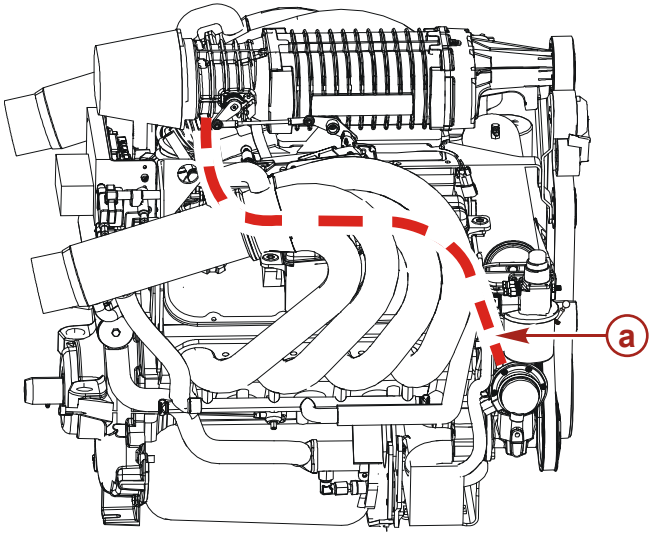
Tube Ref No.	Description	Where Used	Part No.
114	Power Trim and Steering Fluid	Power steering pump	92-858074K01

4. Re-install the cap/dipstick.

CHECKING FUEL PUMP SIGHT TUBE

The mechanical fuel pump has a clear plastic tube connected to the back of the fuel pump, which is routed to the throttle body of the supercharger. If the mechanical fuel pump's internal diaphragm ruptures, fuel by-passes into the plastic tube. This indicates that the fuel pump needs to be replaced.

NOTE: *Vapor or condensation can occur in the tube and is acceptable.*



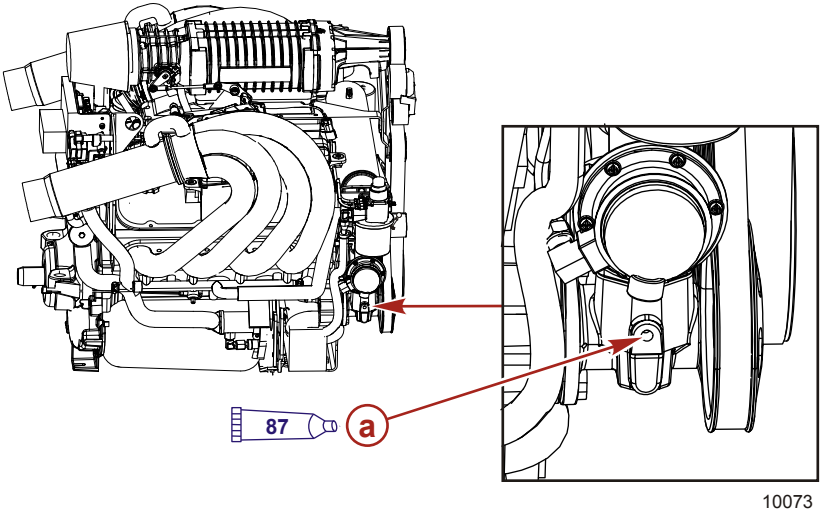
a - Fuel pump sight tube (routed from pump, past the intake manifold, and into the throttle body)

CHECKING SEAWATER/FUEL PUMP OIL

IMPORTANT: Change the oil at specified intervals. Refer to the Maintenance Chart for specific requirements. Use only High Performance Gear Lube in the pump.

1. Remove the fill screw and check the oil level.

2. Ensure that the oil is level with the bottom of the fill hole. A low oil level indicates an internal problem, contact your authorized Mercury Marine dealer for appropriate service. Do not operate engine if this oil level is low.



a - Oil level screw

Tube Ref No.	Description	Where Used	Part No.
87	High Performance Gear Lubricant	Seawater/fuel pump	92-802854A1

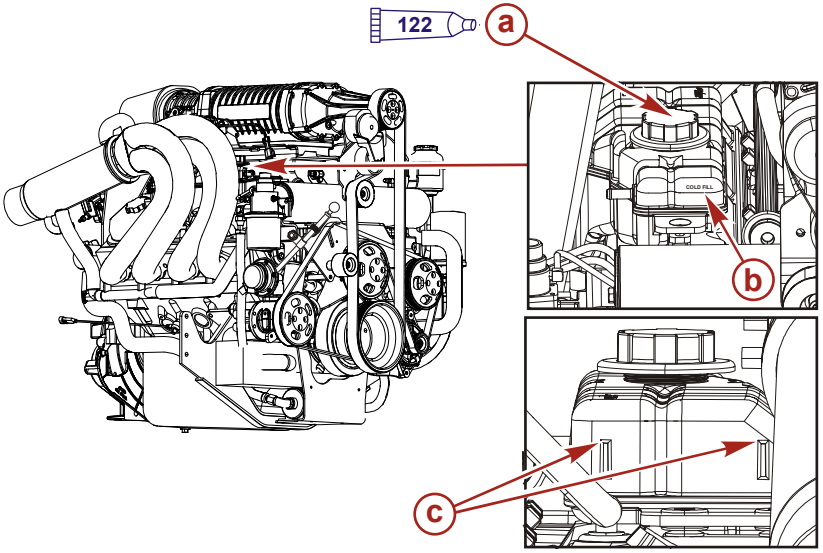
CHECKING ENGINE COOLANT

⚠ WARNING

Avoid personal injury and burns from hot engine coolant. Allow the engine to cool down before removing the coolant pressure cap. A sudden loss of pressure could cause hot coolant to boil and discharge violently.

IMPORTANT: Check engine coolant before starting engine.

1. Check the coolant level in the coolant reservoir when the engine is cold. Ensure that the coolant level is at the "COLD FULL" line on the front of the reservoir or to the top of the raised bosses on the back of the reservoir. Add specified coolant by turning the cap 1/4 turn to allow any pressure to escape slowly, then push down and turn the cap all the way off.



10140

a - Coolant reservoir cap
b - Cold full decal on the front of the reservoir
c - Cold full raised bosses on the back of the reservoir

Tube Ref No.	Description	Where Used	Part No.
122	Extended Life Antifreeze/Coolant	Closed cooling system	92-877770K1

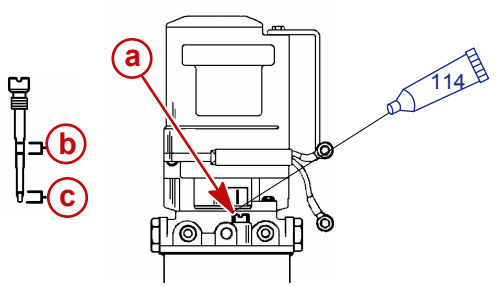
2. If coolant is low, inspect the coolant recovery system for leaks.
3. Inspect the cap for damage and replace if necessary.

CHECKING POWER TRIM PUMP FLUID

IMPORTANT: Check oil level with the sterndrive unit in the full down position.

Use only Mercury Quicksilver Power Trim and Steering Fluid, SAE 10W-30, or 10W-40 engine oil in power trim system.

1. Place the sterndrive unit in the full down/in position.
2. Wipe the fill/vent screw with a clean lint-free cloth.
3. Re-insert it back into the pump, but do not thread into the pump.
4. Remove the fill/vent screw and note the oil level. Ensure that the oil level lies between the "ADD" and "FULL" marks on the dipstick.



or48-1

a - Power trim pump fill/vent screw

b - "FULL" level

c - "ADD" level

Tube Ref No.	Description	Where Used	Part No.
114	Power Trim and Steering Fluid	Power trim pump	92-858074K01

5. If necessary, add fluid through the fill/vent screw hole to bring level up to the "FULL" mark on the dipstick. Do not overfill.

Tube Ref No.	Description	Where Used	Part No.
114	Power Trim and Steering Fluid	Fill/Vent Screw	92-858074K01

6. To purge the system of air, trim the sterndrive unit two or three times. Recheck the fluid level and add if necessary.

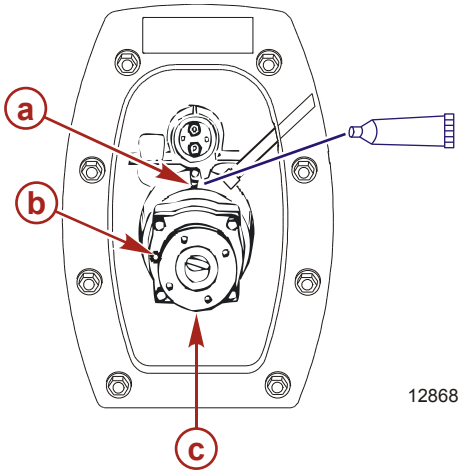
7. Reinstall the fill/vent screw by turning it all the way in, then loosen one and a half turns.

⚠ CAUTION

Fill/Vent screw must be backed out one and a half (1-1/2) turns (after bottoming out) to vent pump reservoir. Failure to loosen the screw could damage the pump.

CHECKING TRANSOM INPUT SHAFT BEARING HOUSING (DRIVE-LINE MODELS ONLY)

1. Remove the level indication (middle) pipe plug from the input shaft housing. Ensure that the gear lube level lies at the bottom of the hole. If not, remove the pipe plug from the top of the input shaft housing.



a - Top pipe plug hole (Fill)
b - Middle pipe plug hole (Check level)
c - Bottom pipe plug hole (Drain)

Tube Ref No.	Description	Where Used	Part No.
	Torco MTF Gear Oil	Transom input shaft bearing housing	Obtain Locally

2. Fill the input shaft housing through the top pipe plug hole with Torco MTF Gear Lube until gear lube flows from the middle pipe plug hole (do not overfill).

3. Install the pipe plugs into the input shaft housing and tighten securely.

CHECKING DRIVE UNIT GEAR LUBE

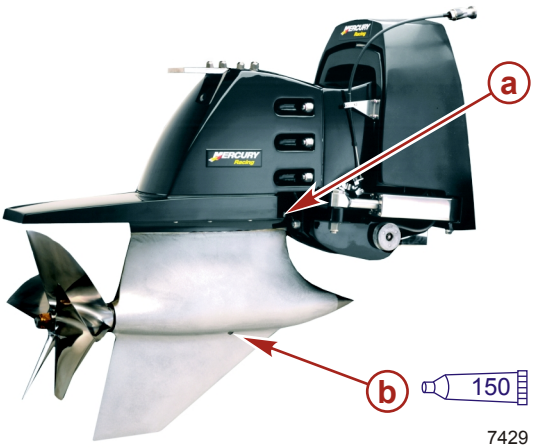
⚠ WARNING

Avoid damage to the sterndrive assembly. Do not overfill the Dry Sump Six (VI) Drive.

IMPORTANT: Fill the dry sump drive with TORCO MTF Gear Oil.

NOTE: *The Dry Sump Six Drive is filled with Torco MTF Gear Oil at the factory. Check the drive unit gear oil level before and after the first sea trial.*

1. Remove the upper vent plug from the gearcase. Ensure that the gear lubelies at the bottom of the vent plug hole with the propeller shaft level.



a - Top vent screw
b - Fill/drain screw

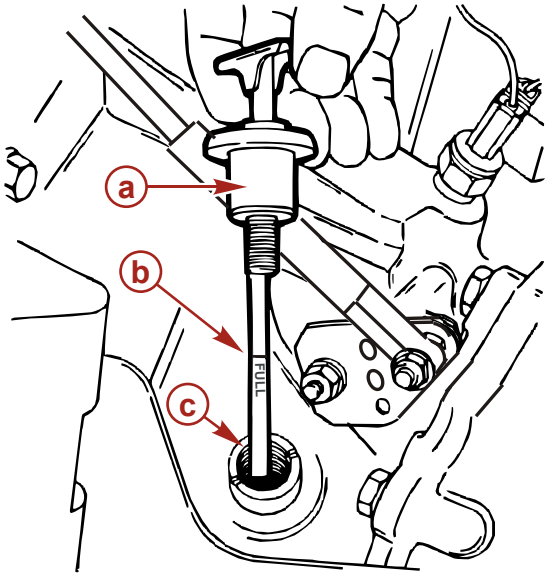
2. If gear lube level is low, remove the lower fill plug from the gearcase and fill until gear lube comes out of the top vent plug opening.
3. Install the upper vent plug.
4. Remove filler tube and install the lower fill plug.

CHECKING TRANSMISSION FLUID LEVEL

IMPORTANT: Place the boat on a trailer or in a sling with the engine level during the first fluid level check. Add fluid until the dipstick reads "FULL," then put the boat in the water and re-check the fluid level. Mark the dipstick at the new fluid level and use this mark when checking the fluid with the boat in the water.

NOTE: *If the engine has not been run for more than two weeks, fluid can drain out of the transmission pistons and change the fluid level by as much as one quart.*

1. Operate the engine for at least two minutes at idle, shifting the transmission from forward to reverse several times.
2. Shut the engine off and check dipstick level. Add fluid as necessary. Use only Type F or Type FA fluid in this transmission.

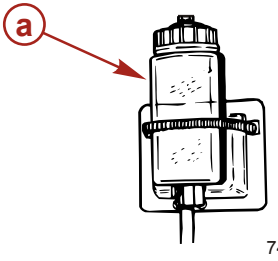


6790

a - Dipstick
b - "FULL" mark
c - Dipstick tube

Tube Ref No.	Description	Where Used	Part No.
	Type F or FA Transmission Fluid	Transmission	Obtain Locally

3. Do not use the transmission expansion bottle as a fluid reservoir. The bottle is only to be used for fluid expansion and overflow.

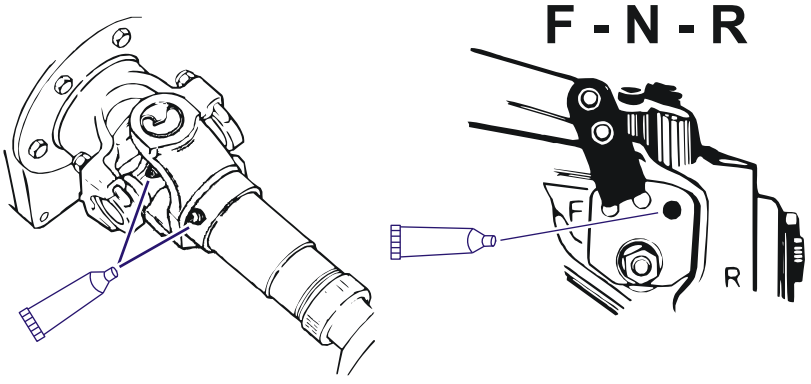


a - Transmission expansion bottle

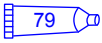
Lubrication Points

Lubricate the following grease fittings with Optimal PD-2:

- Engine driveshaft universal joints and slip yoke (driveline models only).
- Transmission shift lever - Lubricate poppet ball.

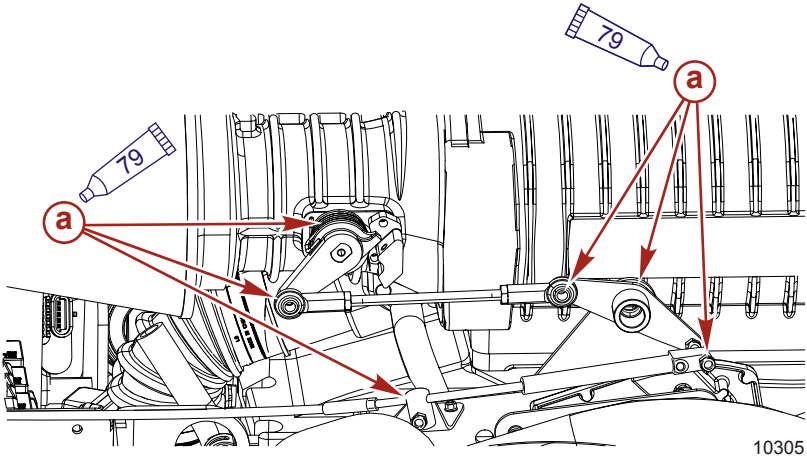


Tube Ref. No.	Description	Where Used	Part No.
	Optimal Longtime PD2 Extreme Pressure Grease	Engine drive shaft and transmission shift lever	92-848767

Tube Ref No.	Description	Where Used	Part No.
	MerCruiser 4-cycle 25W40 Engine Oil	Shift cable and throttle linkage	92-802837A1

Lubricate pivot points with SAE 25W40 motor oil:

- Shift cable.
- Throttle linkage and cable - Lubricate cable and swivels.



a - Lubrication points

Tube Ref No.	Description	Where Used	Part No.
	MerCruiser 4-cycle 25W40 Engine Oil	Pivot points	92-802837A1

Propellers

⚠ WARNING

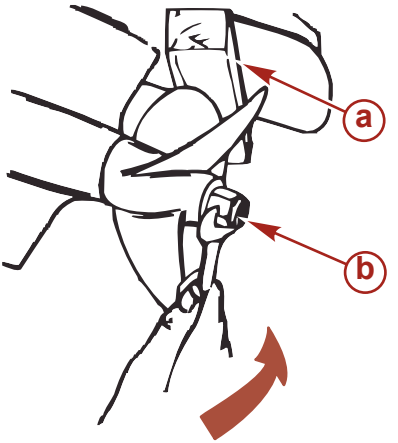
Avoid serious injury or death. Place the remote control in neutral and remove the ignition key from the switch before removing and/or installing the propeller. Place a block of wood between the anti-ventilation plate and the propeller to protect hands from propeller blades and to prevent the propeller from rotating when removing the propeller nut.

⚠ CAUTION

Avoid propeller/sterndrive damage or injury. Periodically check propeller nut for tightness during boating season. A minimum of 136 Nm (100 lb-ft) torque is required.

REMOVAL

1. Place a wood block between the propeller blade and the anti-ventilation plate to prevent rotation.



7448

a - Wood block
b - Propeller nut

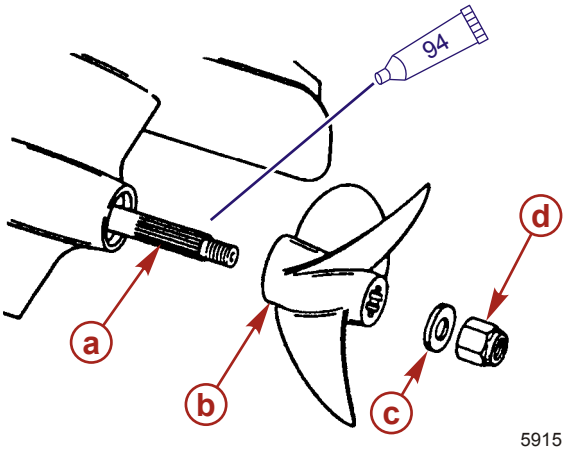
2. Turn the propeller shaft nut counter-clockwise to remove the nut.

3. Slide washer, continuity washer, and propeller off propeller shaft.

NOTE: *Some damaged propellers can be repaired. See your dealer.*

INSTALLATION

1. Apply a liberal coat of Optimal Longtime PD2 Extreme Pressure Grease to propeller shaft.
2. Align splines and install propeller, washer and propeller nut.



a - Propshaft
b - Cleaver propeller
c - Flat washer
d - Propeller nut

Tube Ref. No.	Description	Where Used	Part No.
	Optimal Longtime PD2 Extreme Pressure Grease	Propeller shaft splines	92-848767

3. Place wood block between the propeller blade and anti-ventilation plate to prevent rotation and tighten the propeller nut. After first use, re-tighten propeller nut. Check propeller at least every 20 hours of operation. Do not operate with a loose propeller.

Description	Nm	lb. in.	lb. ft.
Propeller nut	136		100

Flushing Cooling System

⚠ WARNING

Avoid possible death or serious injury. Always remove the propeller before flushing the cooling system.

⚠ CAUTION

Avoid engine damage from overheating. If the engine is operated above 1500 RPM during flushing, suction created by the seawater pickup pump may collapse the flushing water hose causing the engine to overheat.

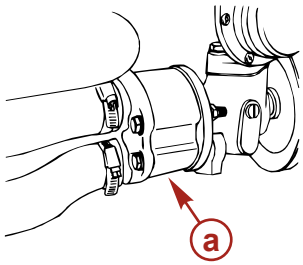
To prevent silt and salt build-up in the cooling system, flush with freshwater.

1. Install a flushing hose from a water tap to the flushing connector/water pick-up. Consult your boat owner's manual for the location and procedures for water connection.
2. Completely open the water tap. Place the remote control in neutral position and start the engine. Operate the engine at idle speed, in neutral, for about 10 minutes or until discharge water is clear. Stop the engine, shut off the water, and remove the flushing hose.

Seawater Pump Impeller Inspection

Service should be performed by an authorized Mercury MerCruiser dealer.

1. Inspect seawater pump impeller if insufficient seawater flow occurs or if operating temperature exceeds normal range.



a - Seawater pump

Cleaning the Seawater (Raw Water) Section of the Engine Oil, Power Steering, Fuel, and Transmission Coolers

⚠ CAUTION

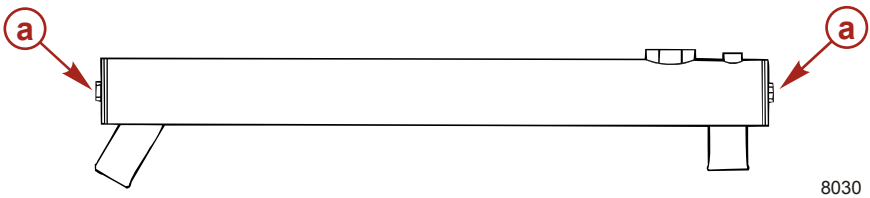
Avoid seawater entry into the boat. When cleaning engine oil or power steering coolers with the boat in the water, be sure to close off the water supply from the seawater pump to the cooler or water may enter the boat when end plates or hoses are removed.

The seawater section of the oil cooler should be cleaned at least once a year, or whenever decreased cooling efficiency is noticed.

ENGINE OIL COOLER

NOTE: *The engine oil cooler is located on the top rear portion of the engine.*

1. Remove the end plates and gaskets.



a - End plates (2)

2. Clean the oil cooler with a suitable brush.

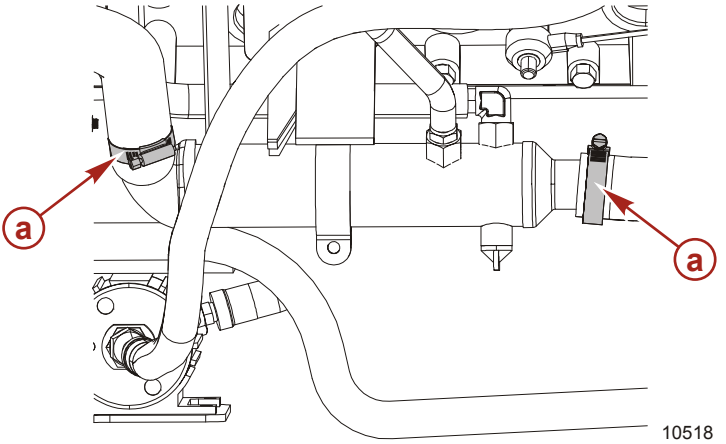
3. Flush the passages with fresh water.
4. Inspect the gaskets for deterioration and replace if necessary.
5. Install the gaskets and end plates. Tighten the screws securely.

POWER STEERING COOLER

NOTE: The power steering cooler is located on the lower port side of the engine.

1. Loosen the water hose clamps and remove the hoses to inspect and clean the cooler.

IMPORTANT: If the oil hoses need to be removed from the cooler, be prepared to cap or plug them to avoid draining the power steering reservoir.



a - Hose clamps (2)

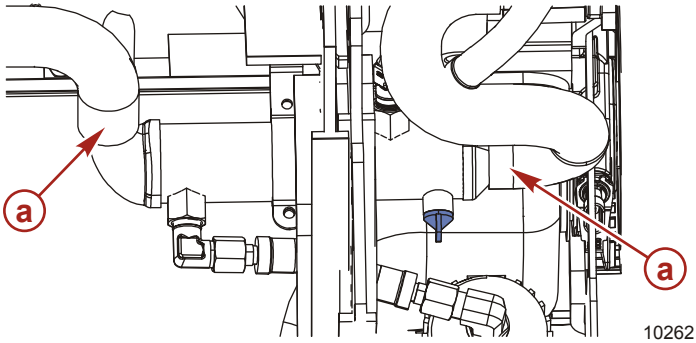
2. Re-install the cooler and tighten the hose clamps securely.
3. Check the power steering fluid level.
4. Start the engine and inspect the cooling system for leaks.

FUEL COOLER

NOTE: The fuel cooler is located on the lower starboard side of the engine.

1. Loosen the water hose clamps and remove the water hoses to inspect and clean the cooler.

2. If the fuel hoses need to be removed from the cooler, have this service done by an authorized Mercury Marine dealer.



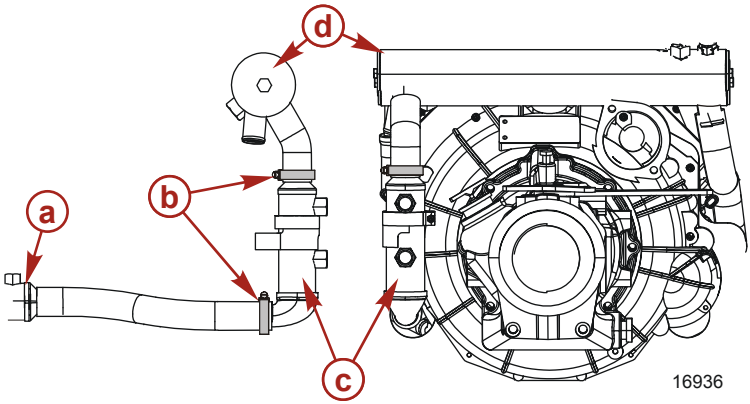
a - Hose clamps to the fuel cooler

3. Re-install the cooler and tighten the hose clamps securely.
4. Start the engine and inspect the cooling system for leaks.

TRANSMISSION COOLER

NOTE: *The transmission cooler is located on the lower rear port side of the engine, next to the flywheel.*

1. Loosen the hose clamps and remove the water hoses to inspect and clean the cooler.



a - Power steering cooler
b - Hose clamps
c - Transmission cooler
d - Engine oil cooler

2. Clean the oil cooler with a suitable brush.
3. Flush the cooler with fresh water.

4. Drain the water from the cooler and hoses completely.
5. Install the hoses and clamps. Tighten the screws securely.

Serpentine and Supercharger Drive Belts

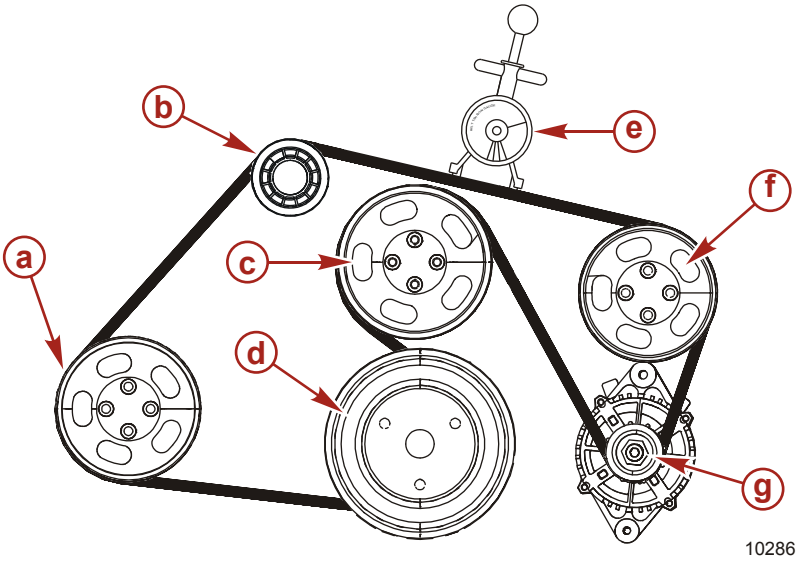
SERPENTINE DRIVE BELT ROUTING AND TENSION

⚠ WARNING

Avoid possible serious injury. Make sure that the engine is turned off and the ignition key is removed before inspecting belts.

IMPORTANT: The drive belt must be routed as shown or damage may result.

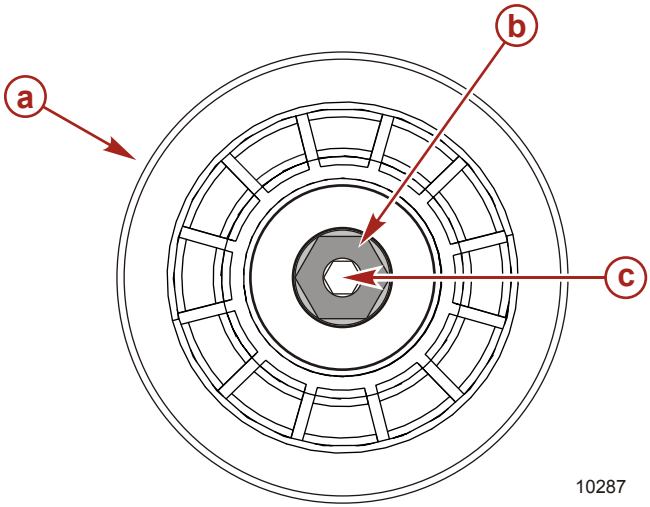
1. Install the belt tension gauge onto the belt.



- **a -** Seawater pump pulley
- **b -** Belt adjustment pulley
- **c -** Re-circulating pump pulley
- **d -** Crankshaft pulley
- **e -** Belt tension gauge
- **f -** Power steering pulley (non-power steering models have an idler pulley)
- **g -** Alternator pulley

Description	N	lb.
New Belt	489	110
Used Belt	400	90

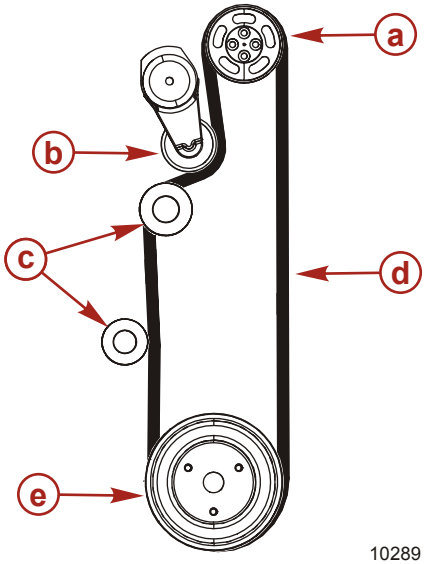
2. Loosen the 5/8 in. locking nut on the adjusting screw. Leave the wrench on the adjustment nut.
3. Use a 5/16 in. socket and tighten the adjusting screw until the belt tension conforms to the correct setting on the gauge.
4. Hold the adjustment stud and tighten the 5/8 in locking nut.



a - Belt tensioner pulley
b - Adjustment locking nut
c - Adjustment screw

5. Remove the belt tension gauge from the belt.
6. Run the engine for a few minutes and re-check the tension.

SUPERCHARGER DRIVE BELT ROUTING AND TENSION

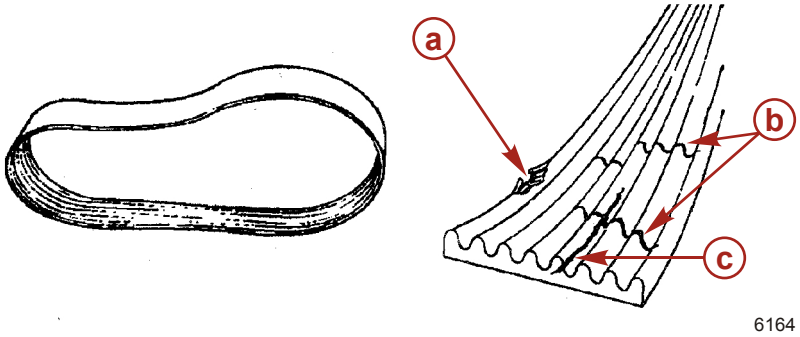


a - Supercharger pulley
b - Self adjusting belt tensioner
c - Idler pulley
d - Supercharger belt
e - Crankshaft pulley

The supercharger belt uses a self tensioner and does not require tension adjustment.

INSPECTING BELTS

NOTE: *Minor, transverse cracks (across the belt width) may be acceptable. Longitudinal cracks (in the direction of belt length) that join transverse cracks are not acceptable.*



a - Fraying
b - Transverse cracks
c - Longitudinal cracks

The belt will have to be replaced for the following conditions:

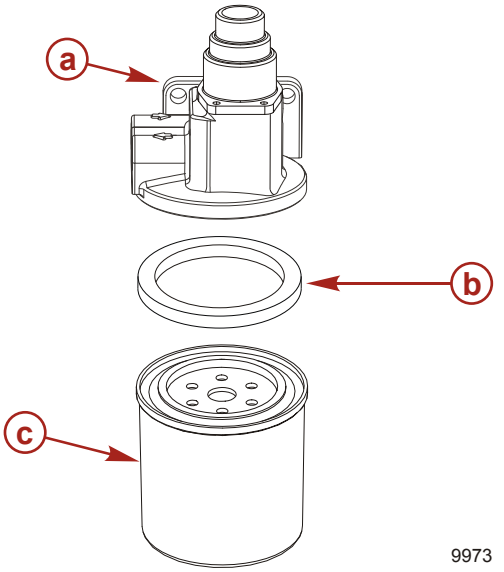
- Excessive wear
- Cracks as explained previously
- Fraying
- Glazed surfaces

Fuel Filters

⚠ WARNING

Avoid serious injury or death from a gasoline fire or explosion. When changing fuel system components be sure that the ignition key is "OFF", that the lanyard stop switch is positioned so that the engine cannot start, and that there are no sources of high heat, spark, open flame, or lit smoking materials in use in the area. Wipe up any spilled fuel immediately.

1. Remove the water separating fuel filter (by turning counter-clockwise) and the sealing ring from the water separating/fuel pressure regulator housing and discard.



a - Water separating/fuel pressure regulator housing

b - Sealing ring

c - Water separating fuel filter

2. Coat the sealing ring on the new filter with clean motor oil.

IMPORTANT: Do not use a filter wrench when installing the water separating fuel filter.

3. Thread the filter clockwise onto the housing and tighten securely by hand. Do not over-tighten.
4. Start and run the engine. If the engine stops or will not start, it may be necessary to prime the fuel system (see *Priming the Fuel System Prior to Starting* in the **Cold Weather or Extended Storage** section of this manual.)
5. Check the filter for gasoline leaks. If leaks exist, re-check the filter installation.
6. If leaks continue, stop the engine immediately and contact your authorized Mercury Marine dealer.

Corrosion and Corrosion Protection

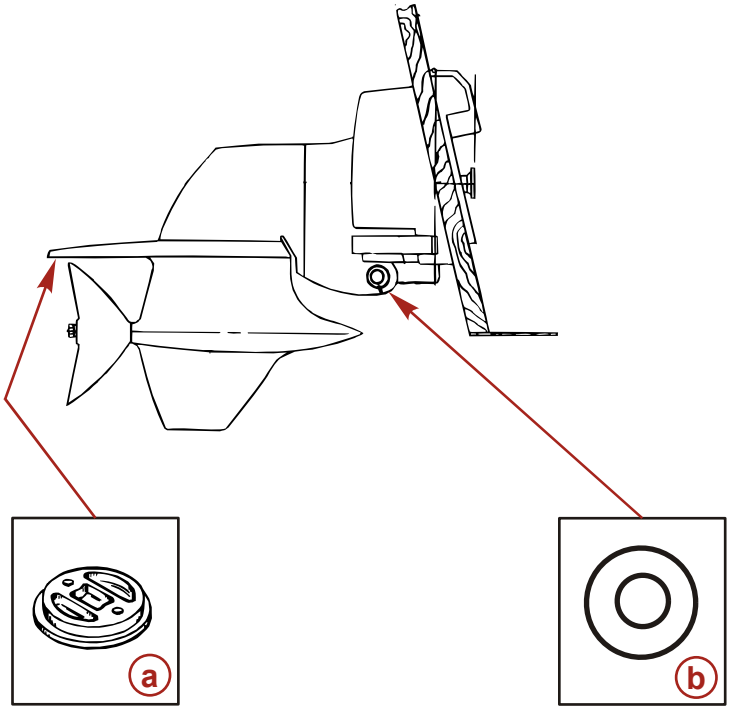
Whenever two or more dissimilar metals (like those found on the sterndrive) are submerged in a conductive solution, such as saltwater, polluted water, or water with a high mineral content, a chemical reaction takes place causing electrical current to flow between metals. The electrical current flow causes the metal that is most chemically active, or anodic, to erode. This is known as galvanic corrosion and, if not controlled, it will in time cause the need for replacement of power package components exposed to water.

Refer to the Quicksilver booklet, **Everything You Need to Know About Marine Corrosion** for more corrosion information.

⚠ CAUTION

Avoid corrosion damage. Do not use magnesium anodes in salt water. They will provide overprotection, resulting in a different electrochemical reaction that will create hydrogen on the metal surface of the drive, under the paint. This causes the paint to blister and peel completely from the surface of the overprotected drive.

IMPORTANT: If a boat is equipped with stainless steel after planes, a large anode should be installed on each to handle the increased galvanic corrosion potential.
Replace sacrificial anodes if eroded 50% or more.
Mercury Marine recommends using anodes sold through Mercury Precision Parts only. Some other manufacturers of aluminum anodes use alloys that are insufficiently pure to adequately protect critical drive components for the duration of the anodes' expected life.



a - An anode is mounted to the underside of the anti-ventilation plate and is retained by two nuts.

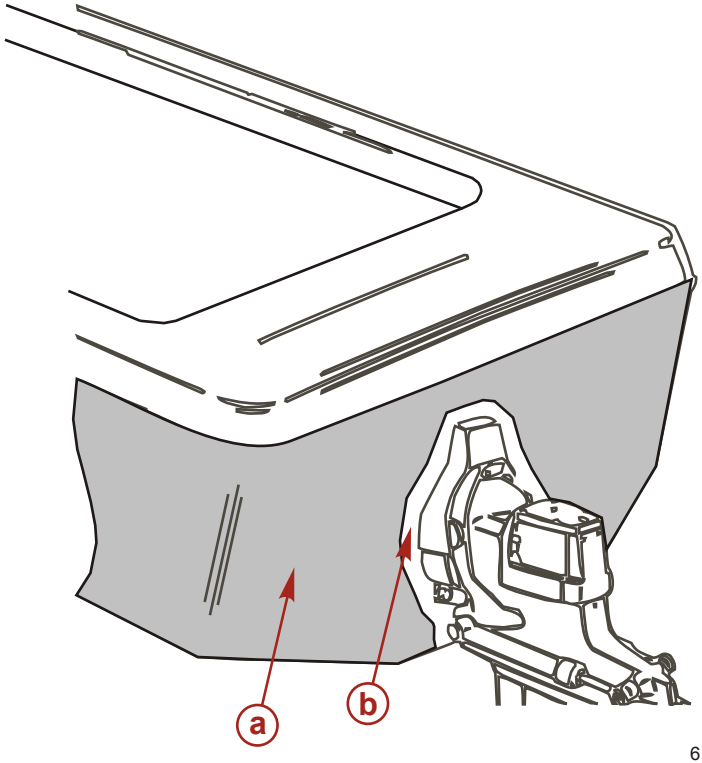
b - There are additional anodes on the trim cylinder pins.

In addition to the corrosion protection devices, follow these steps to inhibit corrosion:

1. **Painting Boat Hull or Boat Transom**

a. If anti-fouling protection is required for boat hull or boat transom, copper or tin base paints can be used unless otherwise prohibited by law.

b. If using copper or tin based anti-fouling paints, avoid any electrical interconnection between the Mercury Marine Product, anodic blocks, and the paint by allowing a minimum of 40 mm (1.5 in.) unpainted area on the transom of the boat around these items.



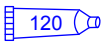
6118

a - Anti-fouling paint
b - Unpainted area

IMPORTANT: Corrosion damage that results from the improper application of anti-fouling paint will not be covered by the limited warranty.

NOTE: *Do not paint anodes. Painting anodes will render them ineffective as galvanic corrosion inhibitors.*

2. **Painting Drive Unit or Transom Assembly**
   - Paint the drive unit and transom assembly with a good quality marine paint or an anti-fouling paint that does not contain copper, tin, or any other material that could conduct electrical current. Do not paint drain holes, anodes, or items specified by the boat manufacturer.
3. **Additional Corrosion Prevention Tips**
   - Spray the power package components on the inside of the boat every two to three weeks with Corrosion Guard to protect the finish from dulling and corrosion. External power package components may also be sprayed.

Tube Ref No.	Description	Where Used	Part No.
	Corrosion Guard	Power package	92-802878-5 5

   - All lubrication points, especially the steering system and shift and throttle linkages, should be kept well lubricated.
   - Flush the raw water portion of the cooling system after each use.

Battery

All lead acid batteries discharge when not in use. Recharge every 30 to 45 days, or when specific gravity drops below battery manufacturer's specifications.

Refer to specific instructions and warnings accompanying your battery. If this information is not available, observe the following:

⚠ WARNING

Observe the following when jump starting, charging or handling a battery:

- **Do not use jumper cables and a booster battery to start engine.**
- **When charging batteries, ensure battery compartment or area where batteries are located, is well-vented.**
- **Do not recharge a weak battery in the boat.**
- **Remove battery and recharge in a ventilated area away from fuel vapors, sparks or flames.**
- **Hydrogen gases that escape from the battery during charging are explosive.**
- **Batteries contain acid that can cause severe burns - Avoid contact with skin, eyes and clothing.**
- **Batteries produce hydrogen and oxygen gases when being charged.**
- **This explosive gas escapes fill/vent cell caps and may form an explosive atmosphere around the battery for several hours after it has been charged.**
- **Sparks or flames can ignite the gas and cause an explosion which may shatter the battery and could cause blindness or other serious injury.**

Bottom of Boat

To maintain maximum speed, ensure that the boat bottom is:

- Clean, free of barnacles and marine growth.
- Free of distortion, nearly flat where it contacts water.
- Straight and smooth, fore and aft.

Marine vegetation may accumulate when the boat is docked. This growth must be removed before operation; it may clog water inlets and cause the engine to overheat.

MAINTENANCE

Inspection and Maintenance

Inspect the power package often and at regular intervals to help maintain its top operating performance, and correct potential problems before they occur. The entire power package should be checked carefully, including all accessible engine parts.

1. Check for loose, damaged or missing parts, hoses and clamps; tighten or replace as required.
2. Check plug leads and electrical leads for damage.
3. Remove and inspect the propeller. If nicked, bent or cracked, see your authorized Mercury Marine dealer.
4. Repair nicks and corrosion damage on the power package's exterior finish. Use Quicksilver spray paints - see your authorized Mercury Marine dealer.

Attention Required After Submersion

- Before recovery, contact an authorized Mercury Marine dealer.
- After recovery, immediate service by an authorized Mercury Marine dealer is required to prevent serious damage to power package.

COLD WEATHER OR EXTENDED STORAGE

Power Package Lay-up

In addition to the procedures listed in the **Maintenance Chart** of this manual, the following procedures should also be done when ever the power package will not be used for any extended period of time. The boat should be taken out of the water to complete the tasks. Consult your authorized Mercury Marine dealer.

NOTE: *It is recommended that the power package lay-up be performed by an authorized Mercury Marine dealer.*

Flushing the cooling system and preparing the fuel system for extended storage can be done at the same time. Perform all yearly checks, inspections, lubrication and fluid changes as outlined in the **Maintenance Charts** of this manual.

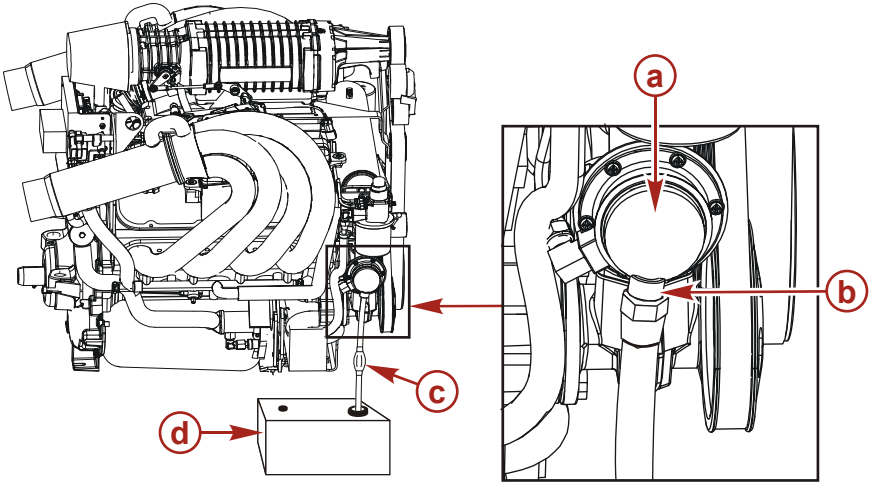
⚠ CAUTION

Avoid engine or sterndrive damage; Do not operate the engine without water flowing through the seawater pickup pump. The pump impeller can be damaged and damage to the engine or sterndrive unit may result.

1. With the boat out of the water, place the drive unit in its full down position.
2. Remove the propeller to avoid injury while performing the following procedures. Also, the propeller shaft will need lubrication while performing drive unit maintenance later in this section.
3. Attach a water hose to the boat's external water pickup, to allow water to be supplied to the engine block while the engine is running. See the boat owner's manual for information on connecting a water supply to the boat's external water pickup.
4. Prepare the fuel system for extended storage by mixing the following in a 23 liter (6 U.S. gal) remote outboard fuel tank:
   - 19 liter (5 U.S. gal) premium unleaded 91 octane (R+M)/2 (98 RON) gasoline.
   - 1.89 liter (64 fl oz) Premium Plus 2-cycle TC-W3 outboard oil.

- 150 ml (5 fl oz) Fuel System Treatment and Stabilizer or 30 ml (1 fl oz) Fuel System Treatment and Stabilizer Concentrate.

5. Close the fuel shut off valve if equipped.
6. Disconnect the boat's fuel line from the mechanical fuel pump inlet.
7. Connect the remote outboard fuel tank supply line to the mechanical fuel pump inlet.



13030

a - Mechanical fuel pump
b - Fuel inlet
c - Primer bulb (optional)
d - 23 L (6 U.S. gal) remote outboard fuel tank

8. Open the water tap to supply enough water flow to the sea pump so that suction created by the sea pump, does not collapse the supply hose and cause the engine to overheat while running.

⚠ WARNING

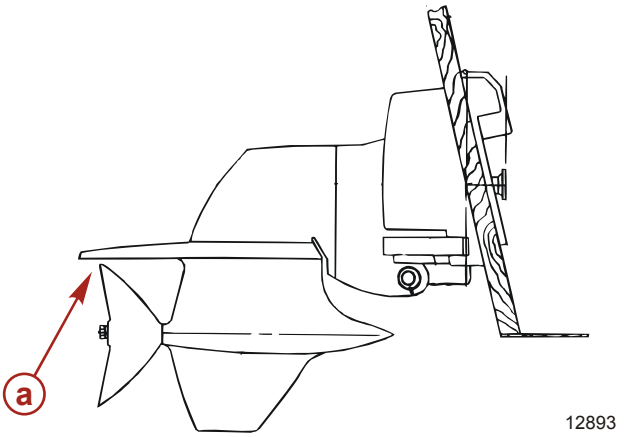
Avoid Fire or Explosion. Ensure that the engine compartment is well ventilated and no gasoline vapors are present during the following operation.

9. Start the engine. If the engine has trouble starting and the remote tank is equipped with a primer bulb, squeeze the primer bulb until firm and attempt starting again.
10. Once the engine starts, run the engine at idle for a short warm-up period and then increase to 1300 RPM for a minimum of five minutes.

IMPORTANT: Do not run the engine's fuel system dry of the fogging mixture in the 23 liter (6 U.S. gal) remote outboard fuel tank.

11. Check the water discharge from the engine. It should be clear when the system is properly flushed. Refer to **Maintenance - Flushing Cooling System**.
12. After the specified running time is complete, slowly return the throttle to idle RPM and shut off the engine.
13. Shut off the water tap.
14. Drain the seawater cooling system and if desired, flush the system with anitfreeze as explained in **Cold Weather or Extended Storage - Cooling System Draining Instructions**. When running the engine, use the fogging mixture as the fuel supply.
15. Perform all engine and transmission maintenance procedures. Refer to **Maintenance - Changing Fluids** of this manual.
16. Perform the draining procedures. Refer to **Cold Weather or Extended Storage - Cooling System Draining Instructions**.
17. Perform battery maintenance. Refer to **Cold Weather or Extended Storage - Battery Storage**.
18. Perform all drive unit and trim pump maintenance procedures. Refer to **Maintenance - Changing Fluids** and **Maintenance - Changing Drive Unit Gear Lube**.

19. Make sure the drainage passage near the anode in the anti-cavitation plate is open and unobstructed.



a - Anti-cavitation plate anode drain hole

20. The drive unit should be stored in the full down position.

NOTICE
The universal joint bellows may develop a set when stored in a raised or up position, causing the bellows to fail when returned to service and allowing water to enter the boat. Store the sterndrive in the full down position.

21. Perform all yearly checks, inspections, lubrication and fluid changes as outlined in the **Maintenance Chart** of this manual.

Cooling System Draining Instructions

NOTICE
Avoid cooling system and engine damage. Water trapped in the seawater section of the cooling system can cause corrosion damage, freeze damage, or both. Ensure the seawater section of the cooling system is drained immediately after operation, or before any length of storage in cold weather, if the possibility of freezing temperatures exists. If the boat is in the water, keep the seacock closed until restarting the engine to prevent water from flowing back into the cooling system. If the boat is not fitted with a seacock, leave the water inlet hose disconnected and plugged.

COLD WEATHER OR EXTENDED STORAGE

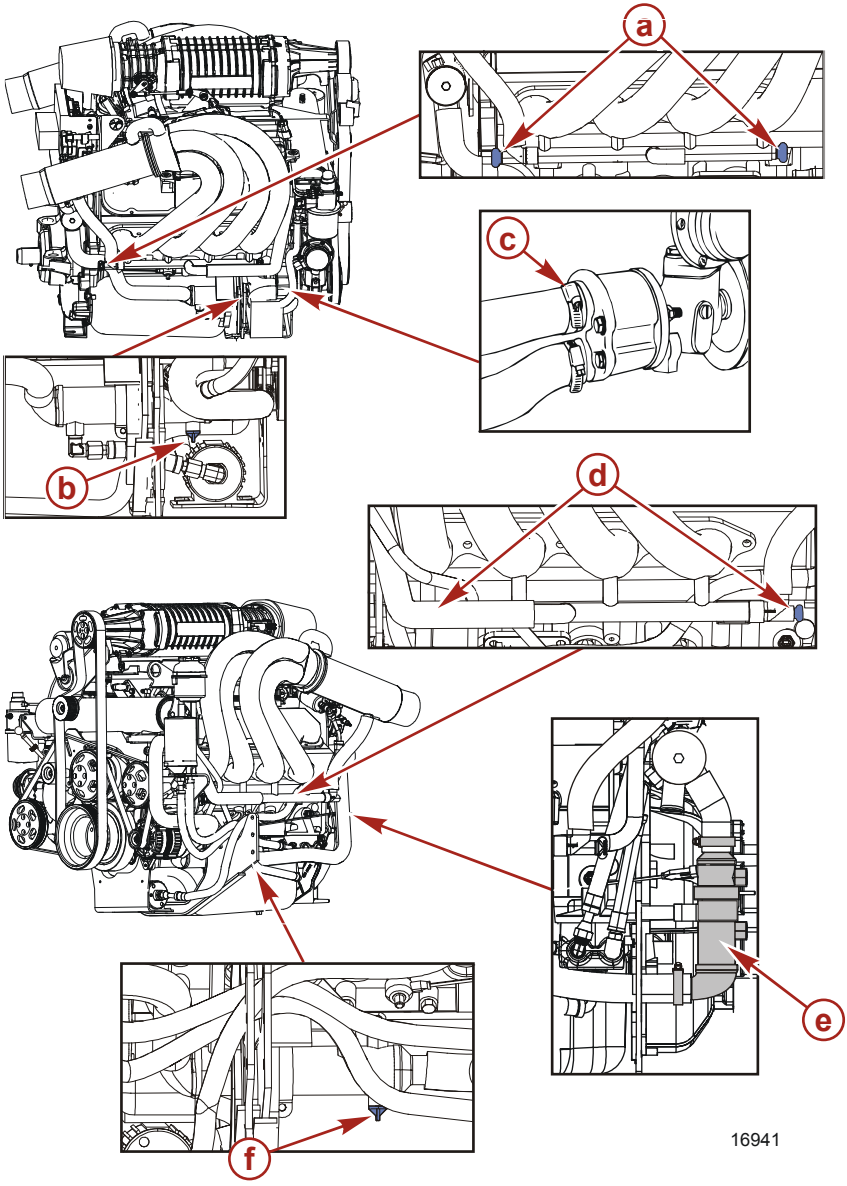
NOTE: *As a precautionary measure, attach a tag to the key switch or steering wheel of the boat reminding the operator to open the seacock or unplug and reconnect the water inlet hose before starting the engine.*

IMPORTANT: In the following draining procedure, the seawater inlet hose will be removed from the engine. If the boat is in the water during the following procedure, close the seawater inlet valve to avoid water entering the boat. If the boat is to remain in the water, do not open the seawater inlet valve again until the power package is ready for recommissioning.

NOTE: *The boat must be as level as possible to ensure complete draining of cooling system.*

1. If the boat is in the water, close the seawater inlet valve.
2. Remove the following drain plugs and hose:
   - End of exhaust manifold distribution rails (plastic wing-nut plugs, port and starboard)
   - Fuel cooler (plastic wing-nut plug, Starboard side of the engine)
   - Seapump (remove the inlet hose from the seapump and allow to drain)
   - Transmission cooler (remove the hose from bottom of the cooler and allow to drain)
   - Power steering cooler (plastic wing-nut plug, Port side of the engine)

COLD WEATHER OR EXTENDED STORAGE



a - Exhaust header balance rail plastic wing-nut plugs (2, Starboard side)
b - Fuel cooler plastic wing-nut plug
c - Sea water inlet hose - remove from sea pump to drain
d - Exhaust header distribution rail plastic wing-nut plugs (2, Port side, one plug is hidden)
e - Transmission cooler - remove hose to drain
f - Power steering cooler plastic wing-nut plug

3. Use a stiff piece of wire to clean out any seawater debris from the drain holes. Do this until the entire system is drained.
4. Lift or bend the hoses to allow water to drain completely.
5. After draining the seawater cooling system, reinstall the drain plugs.
6. Reconnect the hoses and tighten all hose clamps securely.

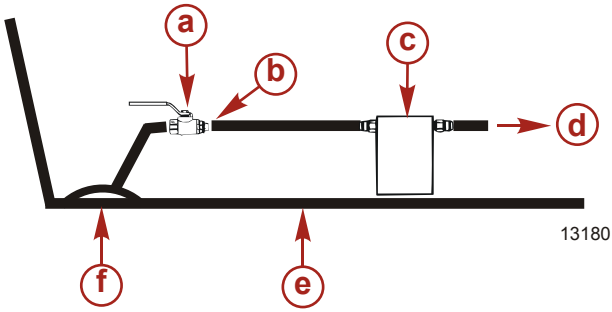
USING ANTIFREEZE

For additional protection against freezing and rust in the engine seawater cooling system when preparing for cold weather or extended storage, antifreeze containing a rust inhibitor can be run through the seawater cooling system. Perform the following procedure for this added protection.

NOTE: *A nontoxic and environmentally safe ethylene glycol antifreeze containing a rust inhibitor must be used when preparing the seawater portion of the cooling system for cold weather or extended storage. Be certain to follow the manufacturer's recommendations.*

1. Place approximately 2 gallons of premixed antifreeze into an appropriate container that will allow the seawater inlet hose to be placed into the container.
2. If the boat is in the water, close the seawater inlet valve.
3. Loosen the hose clamp and remove the seawater inlet hose from the downstream side of the valve.

4. Place the hose into the container of premixed antifreeze. The antifreeze mixture should be at the correct concentration level to protect the engine to the lowest temperature to which it will be exposed during cold weather or extended storage.



a - Seawater inlet valve
b - Disconnect the hose at the valve and place into container of antifreeze
c - Sea strainer
d - To the seawater pump
e - Boat hull
f - Seawater pickup

5. Operate the engine at idle until antifreeze is expelled from the exhaust manifolds of the engine.

NOTE: *The antifreeze can be run through the engine while running the fuel fogging mixture as explained in* ***Cold Weather or Extended Storage - Power Package Lay-up****.*

6. Stop the engine and reconnect the seawater hose.
7. If the boat is in the water, do not open the seawater inlet valve until the power package is ready for recommissioning.

Battery Storage

Whenever the battery will be stored for an extended period of time, be sure the cells are full of water and the battery is fully charged and in good operating condition. It should be clean and free of leaks. Follow the battery manufacturer's instructions for storage.

COLD WEATHER OR EXTENDED STORAGE

Power Package Recommissioning

⚠ WARNING

To prevent possible injury or damage to equipment, do not install the battery until all engine maintenance has been performed.

1. Ensure that all cooling system hoses are connected properly and hose clamps are tight, all removed drain plugs have been installed and are tight.

⚠ CAUTION

Reversing the battery cables or connection order will damage the electrical system. When installing the battery, be sure to connect the positive (+) battery cable to the positive (+) battery terminal first, and the negative (–) battery cable to the negative (–) battery terminal second.

2. Install a fully-charged battery. Clean the battery cable clamps and terminals and reconnect cables. Tighten each cable clamp securely when connecting.
3. Coat battery terminal connections with an anti-corrosion agent.
4. Perform all checks in **Operation Chart** in the *Before Starting* column.
5. Refer to **Flushing Cooling System** before starting engine.
6. Supply water to the engine cooling system.

ENGINE STARTING PROCEDURE

IMPORTANT: The throttle should not be advanced until the engine idles and runs smoothly and the water temperature reaches a minimum of 54 °C (130 °F). Advancing the throttle prematurely while the PCM is in its rich running mode will result in poor engine starting and performance.

1. Connect the main permanent fuel line to the engine.
2. Do not advance the throttle until the engine idles and runs smoothly and the water temperature reaches a minimum of 54 °C (130 °F).

3. Start the engine. If the engine does not start right away, crank the engine over for a maximum of 10 seconds at a time and stop.
4. Repeat the cranking procedure until the engine starts and runs smoothly. Observe the instrumentation to ensure all systems are functioning.
5. Inspect engine for fuel, oil, fluid, water and exhaust leaks.
6. Check the steering system.
7. Check shifting and throttle control for proper operation.

TROUBLESHOOTING

Engine Will Not Crank

Possible Causes	Remedy
Battery switch "OFF".	Switch to "ON" position.
Remote control not in neutral position.	Position control lever to neutral.
Open 50 amp circuit breaker or 15 or 90 amp fuse circuit.	Check and reset circuit breaker or replace fuse.
Master or starter solenoid defective.	Replace.
Loose or dirty electrical connections or damaged wiring, battery cable diameter (gauge) too small for the application.	Check all electrical connections and wires (especially battery cables). Clean and tighten faulty connection.
Low battery charge or defective battery.	Test and replace if defective.
Defective starter.	Test and replace if defective.
Defective key switch.	Replace.
Defective neutral/safety switch.	Replace.

Engine Cranks But Will Not Start

Possible Cause	Remedy
Improper starting procedure	Read starting procedure
Low battery voltage	Charge the battery
Empty fuel tank or fuel shut off valve closed	Fill tank or open valve
Faulty fuel pump, wiring, fuel pump fuse, 50 amp circuit breaker or a fuel pump relay	Replace faulty component
Faulty ignition system component	Service ignition system
Lanyard Stop Activated	Reset
Obstructed fuel filter	Replace filters
Stale or contaminated fuel	If contaminated, drain tank and fill with fresh fuel
Fuel line or tank vent line kinked or restricted	Replace kinked lines or blow out lines with compressed air to remove obstruction
Crankshaft position sensor faulty	Test and replace if faulty
Faulty fuel pressure regulator diaphragm	Test and replace if faulty. Do not attempt to start the engine if the fuel pressure regulator diaphragm is ruptured.

Engine Hard to Start, Runs Rough, Misses, and/or Backfires

Possible Cause	Remedy
Faulty ignition system component.	Service ignition system.
Dirty fuel filter.	Replace filters.
Stale or contaminated fuel.	Drain the fuel tank and fill it with fresh fuel.
Fuel line or fuel tank obstructed.	Replace damaged lines or clean out lines with compressed air to remove the obstruction.
Flame arrestor dirty.	Clean or replace the flame arrestor.
Rev limiter engaging at wide-open-throttle.	Use a propeller with more pitch.

TROUBLESHOOTING

Poor Performance

Possible Cause	Remedy
Throttle not fully open.	Inspect throttle cable and linkages for proper operation.
Damaged or incorrect propeller.	Replace propeller.
Excessive bilge water.	Drain and check for cause of entry.
Boat overloaded or load improperly distributed.	Reduce load or redistribute load more evenly.
Boat bottom fouled or damaged.	Clean or repair as necessary.
Flame arrestor dirty or restricted.	Change or clean flame arrestor.
Stale or contaminated fuel.	If contaminated, drain tank. Fill with fresh fuel.

Engine Coolant Temperature Too Low

Possible Cause	Remedy
Faulty coolant thermostat.	Replace water thermostat.
Faulty gauge or sender.	Test with shop gauge; test sender.
Faulty oil thermostat.	Replace.

Engine Coolant Temperature Too High

Possible Cause	Remedy
Seacock closed.	Open.
Serpentine belt loose or in poor condition.	Replace or adjust belt.
Recirculating pump defective.	Replace.
Seawater pickups obstructed.	Inspect.
Faulty thermostat.	Replace.
Oil cooler cores plugged with foreign material.	Clean cooler cores.
Heat exchanger restricted.	Backflush.
Faulty seawater pickup pump.	Repair.
Seawater discharge restricted or plugged.	Clean exhaust elbows.
Faulty gauges or senders.	Test with shop gauges; test senders.
Aerated water supply to water pick-up.	Place water pick-up in a non-aerated water supply.

Low Engine Oil Pressure

Possible Cause	Remedy
Insufficient oil in system.	Check and add oil.
Excessive oil in system (causing it to become aerated).	Check and bring oil to required level. Check for cause of excessive oil (improper filling, defective fuel pump, etc.).
Diluted or improper viscosity oil.	Change oil and oil filter, using correct grade and viscosity oil. Determine cause for dilution (excessive idling, faulty fuel pump, etc.).
Faulty gauge or sender.	Test with mechanical shop gauge; test sender.
Excessive oil temperature.	Faulty oil thermostat.
Engine mechanical: oil pump, excessive bearing clearance, etc.	Repair as necessary.

Power Trim Does Not Operate (Motor Doesn't Run)

Possible Cause	Remedy
Open fuse.	Replace fuse.
Loose or dirty electrical connections or damaged wiring.	Check all associated electrical connections and wires (especially battery cables). Clean and tighten faulty connections. Repair or replace damaged wiring.

Battery Will Not Come Up On Charge

Possible Cause	Remedy
Excessive current draw from battery.	Turn off non-essential accessories.
Loose or dirty electrical connections or damaged wiring.	Check all associated electrical connections and wires (especially battery cables). Clean and tighten faulty connections. Repair or replace damaged wiring.
Alternator drive belt loose or in poor condition.	Replace and/or adjust.
Defective battery.	Test battery.

Power Trim Does Not Operate (Motor Runs But Drive Unit Does Not Move)

Possible Cause	Remedy
Trim pump oil level low.	Fill pump with oil.
Drive binding in gimbal ring.	Check for obstruction.

TROUBLESHOOTING

Electrical Analog Trim Gauge Malfunction

Possible Cause	Remedy
Gauge indicates off-scale high with no self-test[1] function.	Check wires between the sender and the trim module.
	Replace defective trim sender.
Gauge does not indicate properly but the self test[1] function works.	Index the trim sender, test the trim sender circuit or replace defective trim sender.

Remote Control Operates Hard, Binds, Has Excessive Free-Play or Makes Unusual Sounds

Possible Cause	Remedy
Insufficient lubrication on shift and throttle linkage fasteners.	Lubricate.
Loose or missing shift and throttle linkage fasteners.	Check all linkages. If any are loose or missing, see authorized Mercury Marine dealer immediately.
Shift or throttle cable kinked.	Replace cable.
Friction adjustment excessive.	Adjust friction.

Steering Wheel Turns Hard or Jerky

Possible Cause	Remedy
Low power steering pump fluid level.	Refill system with fluid and check for leaks.
Sepentine belt loose or damaged.	Replace and/or adjust.
Insufficient lubrication on steering system components.	Lubricate.
Loose or missing steering fasteners or parts.	Check all parts and fasteners. If any are loose or missing, see authorized Mercury Marine dealer immediately.
Contaminated power steering fluid.	Drain and replace.
Air in system	Purge air from system

1. Self-test: When the key switch is placed to the "RUN" position, the pointer on the analog gauge will sweep from the bottom of the scale to the top of the scale and then point to the actual trim position.

Seawater Pressure Is Below Specification

Possible Cause	Remedy
Insufficient water supply.	Check if seacock is completely open.
	Check supply hoses for obstruction.
	Check for external water pick-up obstruction.
	Check for sea strainer obstruction.
	Check condition of sea pump.

OWNER SERVICE ASSISTANCE

Local Repair Service

Always return your outboard to your local authorized dealer should the need for service arise. Only he has the factory trained mechanics, knowledge, special tools, equipment, and genuine parts and accessories to properly service your engine should the need occur. He knows your engine best.

Service Away From Home

If you are away from your local dealer and the need arises for service, contact the nearest authorized dealer. Refer to the Yellow Pages of the telephone directory. If, for any reason, you cannot obtain service, contact the nearest Mercury Marine Service Office.

Parts And Accessories Inquiries

All inquiries concerning genuine replacement parts and accessories should be directed to your local authorized dealer. The dealer has the necessary information to order parts and accessories for you. When inquiring on parts and accessories, the dealer requires the model and serial number to order the correct parts.

Service Assistance

Satisfaction with your Sterndrive or Inboard product is very important to your dealer and to us. If you ever have a problem, question or concern about your Sterndrive or Inboard product, contact your dealer or any authorized Mercury Marine dealer. If additional assistance is required, take these steps.

1. Talk with the dealership's sales manager or service manager. If this has already been done, then contact the owner of the dealership.
2. Should you have a question, concern, or problem that cannot be resolved by your dealership, please contact Mercury Marine Service Office for assistance. Mercury Marine will work with you and your dealership to resolve all problems.

The following information will be needed by the service office:

- Your name and address
- Daytime telephone number

- Model and serial number of your outboard
- The name and address of your dealership
- Nature of problem

Mercury Mercruiser Service Offices

For assistance, call, fax, or write. Please include your daytime telephone number with mail and fax correspondence.

United States		
Telephone	Fax	Mercury MerCruiser 3003 N. Perkins Road Stillwater, OK 74075
(405) 743-6566	(405) 743-6570	
United States (Mercury Racing)		
Telephone	Fax	Mercury Racing N7480 County Rd. UU Fond du Lac, WI 54935-9585
(920) 924-2088	(920) 924-2096	
Canada		
Telephone	Fax	Mercury Marine Ltd. 2395 Meadowpine Blvd. Mississauga, Ontario L5N 7W6 Canada
(905) 567-6372	(905) 567-8515	
Australia, Pacific		
Telephone	Fax	Mercury Marine Australia 132-140 Frankston Road Dandenong, Victoria 3164 Australia
(61) (3) 9791-5822	(61) (3) 9793-5880	

OWNER SERVICE ASSISTANCE

Europe, Middle East, Africa		
Telephone	Fax	Marine Power - Europe, Inc. Parc Industriel de Petit-Rechain B-4800 Verviers, Belgium
(32) (87) 32 • 32 • 11	(32) (87) 31 • 19 • 65	
Mexico, Central America, South America, Caribbean		
Telephone	Fax	Mercury Marine 11650 Interchange Circle North Miramar, FL 33025 U.S.A.
(954) 744-3500	(954) 744-3535	
Japan		
Telephone	Fax	Mercury Marine - Japan 283-1 Anshin-cho Hamamatsu Shizuoka, 435-0005 Japan
81-53-423-2500	81-53-423-2510	
Asia, Singapore		
Telephone	Fax	Mercury Marine- Singapore 72 Loyang Way Singapore, 508762
5466160	5467789	

ORDERING LITERATURE

United States and Canada

Before ordering literature, please have the following information about your power package available:

Engine Model:		**Horsepower:**	
Serial Number:		**Model year:**	

For information on additional literature that is available for your particular Mercury/MerCruiser power package and how to order that literature contact your nearest dealer or contact:

MERCURY MARINE		
Telephone	**Fax**	**Mail**
(920) 929-5110	(920) 929-4894	Mercury Marine Attn: Publications Department P.O. Box 1939 Fond du Lac, WI 54936-1939

Outside The United States and Canada

Before ordering literature, please have the following information about your power package available:

Engine Model:		**Horsepower:**	
Serial Number:		**Model year:**	

Contact your nearest dealer or Marine Power Service Center for information on additional literature that is available for your particular Mercury/MerCruiser power package and how to order that literature.

MAINTENANCE LOG

Maintenance Log

Record all maintenance performed on your outboard here. Be sure to save all work orders and receipts.

Date	Maintenance Performed	Engine Hours